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"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—SHERMAN.

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THE MILITARY ACADEMY AND THE EDUCATION OF OFFICERS.

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THE student of American history cannot but be struck with the high value set upon military education by the founders of the Republic. To their minds, in the absence of a large standing army, the safety of the country must depend upon an efficient system of military education and a general diffusion of military knowledge and military spirit among the people. On these factors would depend our ability to raise large armies and to wage successful war.

At the present day the subject has lost none of its importance, and while much has been written upon the subject, it continues to demand its full share of attention from every officer and from every citizen desirous of seeing our army effective and progressive in peace and victorious in war. The growth of a science of education and wide discussions have revolutionized methods of teaching in almost every department of learning. Military education is a special branch of general education and the same general principles apply.

Our present system of military education leaves much to be desired both from the standpoint of the educator and from that of the practical soldier. Not only are the elements of our sys-

tem capable of separate improvement, but they need to be separately systematized and then united together so as to form an harmonious whole, giving us a more complete and logical system than we now possess. A temperate and fair discussion may do something towards securing these desirable ends. In such discussion, however, full account must be taken of our past history and our present necessities as a nation.

The present paper deals principally with the school part of the system, and will touch only incidentally upon the important subjects of an officer's practical training with troops at his post and in the field.

Papers are not infrequently written, inspired by European methods, and drawing conclusions, which, based upon conditions which will probably never be fulfilled here, are as inapplicable to us as though we inhabited a different planet. The fallacy of blindly following European military precedents needs to be continually insisted upon. What we should do is to try by a study of our own institutions and history to find out what are our peculiar needs and then upon this foundation erect the superstructure. Any other mode of building would lack proper foundation and would not stand the stress of actual storm. In this work foreign precedents and practices will be of great value if properly used. One class of precedents we may safely follow, and that is in the matter of material inventions and improvements. If a certain gun proves its superior qualities in Germany, we can safely adopt it in full faith that it will shoot equally well here. In such a case we profit by the larger experience of Europeans. Similarly with broad general principles which find their application everywhere. But when it is a question of organization, recruitment, discipline, etc., wherein the peculiar genius of a nation, its traditions, history or situation must be taken into full account, in short whenever conditions differ, foreign practices, if followed, may lead us into the most egregious errors. The only safe guide is our own experience.

To nothing does the above apply more than to the subject in hand. European systems of military education need material modification before being adopted here, and advancement may better be looked for by modifying and improving our present system. The European officer has his ambition continually fired by the prospect of war,—not as some remote and improbable contingency,—but as an event in which he may be called upon

any day to take an active and it may be a leading part. What a powerful incentive to professional advancement! Frequent manœuvres present to his mind a more or less accurate picture of war and afford him valuable training. The peace strength of the army forms a considerable fraction of its war strength, and as the reserves have their own officers, the officer will go to war with his present grade. Its end may find him with only the increase in rank due to casualties. Again, the officer is educated for one particular arm, and unless he enters the staff his entire service will probably be in that branch.

On the other hand, the American peace army forms such a small fraction of its war strength that war finds the average officer confronted with greatly increased powers and responsibilities for which he has been very inadequately prepared by any previous training. He will be called upon for a variety of duties both in line and staff, at one time commanding a battery, then serving as engineer or commanding a regiment or higher unit. In this country, then, the line between an engineer and artillery officer for instance, between line and staff, cannot be rigidly drawn, and any system of education or training must take this into account. Past experience teaches that the successful command of our volunteers demands a high order of talent. The regular officer called to such command cannot rely solely on his ideas of discipline acquired by service with regular troops. The same principles undoubtedly apply in both cases, but the application to volunteers requires judgment and tact in addition to a real stock of knowledge if the officer is to command the respect and devotion of those under him.

As volunteer troops will form the bulk of our armies, our officers should be educated and trained with special reference to their command. Our officer should receive even a broader education than the foreign officer, and to a good liberal education should be added a knowledge of all arms and a special training in his own arm. To effect this some sort of a general staff is needed. In fact it is a crying necessity in our army to-day. All staff positions (with some few exceptions) should be filled by rotation from the line. Some such system, it would seem, should be an essential feature in a small army like ours where sudden and large expansion is to be expected in case of war. Such a plan would go far towards raising the efficiency of the personnel and give larger experience and better qualifications for command.

Rotation in staff positions contributes largely to the efficiency of the U. S. Navy at present.

MILITARY SCHOOLS.

The officer, first of all, should have a good liberal scientific education. This must be the foundation. He is then fitted to take up the special branches pertaining to the art of war and gain a broad, firm grasp of them.

Among the means of acquiring a scientific military education a special government academy or college is generally considered indispensable. The aspirant for military honors could, to be sure, obtain his scientific education elsewhere, then be commissioned and finish at a professional military school. It is believed that this would fail of producing the best results. Habits of obedience and discipline are easily acquired and become habitual during the plastic period of youth while the mind and body are being simultaneously trained. Hence military schools have been established in all civilized countries for the education of their future officers. Their necessity is proved by the past and few can doubt the wisdom of their establishment and maintenance.

A military school justifies its existence by the high average of its graduates. Successful generals are not made in any school, but the most brilliant general owes his success very largely to the quality of his subordinate officers. It is the province of the schools to raise the efficiency of such subordinates. It is almost an axiom in war that of two nations otherwise equal, that one will be victorious that has the best instructed officers. Napoleon called the Polytechnic School of Paris the "hen that laid him golden eggs," and the surprising ease with which France has often raised large armies has been due in no small degree to the excellence of her military schools.

The highest school, that of actual war, is obviously too costly in blood and money to replace a system of military education. While we are educating our officers the enemy would be gaining battles. The system of post instruction of officers, though capable of being made of great benefit, has been tried in this country in vain *as a system of education*. The atmosphere and associations of a school are absolutely essential.

THE MILITARY ACADEMY.

An offspring of the Revolution, the Military Academy at West Point was finally established on a legal basis by the act of

March 16, 1802. By the terms of this act the Corps of Engineers was separated from the artillery and constituted a military academy. To-day, after a lapse of more than sixty years, the Academy retains essentially the organization, course of studies and system of discipline that was given to it by Colonel Sylvanus Thayer during the period of his superintendency, 1817 to 1833.

Based upon French models, West Point has for many years enjoyed an enviable reputation. An attempt has here been made to unite the science of the Polytechnic School to the military features of St. Cyr. As West Point is the fundamental part of our present military educational system, any plan for the improvement of the system must include West Point. Having past experience to guide us we may expect better results from changes in the present system rather than by working on entirely new lines.

WEST POINT OF TO-DAY.

Considered as an educational system, the merit of West Point lies mainly:

1. In the strict discipline enforced whereby a maximum amount of time is devoted by the student to study and recitations.

2. In the system of recitations, each section of from six to twelve cadets having a separate instructor in each department.

3. In the military exercises and gymnastics whereby the body is kept in good condition and a healthy development insured.

4. In the system of discipline and command tending both to improve the morals and develop character.

With such a hold on the cadet and a commission as a reward for successful endeavor, it is little wonder that West Point can accomplish so much with a low standard of admission and often indifferent material to work upon. It will be observed that the advantages enumerated are independent of the curriculum. The latter may, therefore, be considered by itself, and the question arises, Would not improved methods of instruction and a modified curriculum produce results of more value to the individual and to the service of which he is to form a part?

The Curriculum.—West Point's motto has always been "a few studies well learned," yet an examination of the present curriculum will show a very respectable number of studies and many of them severe ones. This number, according to Prof. Michie, is forty-five as they would be given in a college catalogue. Few

will venture to assert that all of these subjects are well learned by a majority of the class.

Broadly considered, the present course may be grouped under the following heads:

1. The pure mathematics to include the calculus.

2. Application of mathematics to the higher analysis in mechanics, sound and light.

3. Modern languages: English, French, Spanish.

4. Physics: including chemistry, heat, electricity, geology, and astronomy. (Statics, dynamics, etc., under (2) above.)

5. Drawing: free-hand, mechanical and topographical.

6. Applied science: civil and military engineering, art of war, ordnance and gunnery, drill regulations.

7. Law: constitutional, international and military.

8. Outlines of general history.

9. Practical duties of the soldier in the three arms, military engineering and signalling, artillery exercises.

10. Some practical work in astronomy, electricity, surveying, ordnance and gunnery, and mineralogy.

11. Gymnastics, swimming, riding, use of sword, fencing, dancing.

Mathematics forms the ground-work of the course, and a cadet's general standing is nearly always a correct indication of his mathematical ability and *vice versa*. The pure mathematics is pursued for the first two years and a large portion of the following two years' course depends directly on a knowledge of mathematics. Including the philosophical course (which is almost entirely mathematical), the cadet recites upon mathematics one and a half hours a day for three years.

The general opinion is that mathematics is peculiarly adapted to training the mind of the soldier—in fact that it should be the principal study in any system of military education. While to the engineer and the designer mathematical sciences are the indispensable tools, their value *as a mental training* has, to say the least, been overestimated. When we reflect that war is far from being an exact science, it is seen that a rigid mathematical training may fail to develop the highest and most valuable qualities demanded in a soldier. Common observation proves that the best mathematicians are only too often deficient in judgment and in intuition, qualities on which so much depends in war.

The following quotation from the pen of the late Mr. E. L.

Youmans, an authority on education, shows the limitations of mathematical studies so clearly and has such an obvious application to the soldier's training, that it deserves close attention. After pointing out the great value of mathematics as a key to science, he continues:

"But the devotees of tradition are not satisfied with this; they make extravagant claims for mathematics, on the ground of the discipline they afford, and then usurp for the man educational predominance to which they are not entitled. In their subordinate place they are invaluable; as a too engrossing subject of study, injurious. * * *

"But they do not afford a complete exercise of the reasoning powers. They begin with axioms, self-evident truths, established principles, and proceed to their conclusions along a track each step of which is an intuitive certainty. But it so happens that in our mental dealings with the experience of life, the first, the most important, and the most difficult thing is to get the data or premises from which to reason. The preliminary question is, What are the facts, the pertinent facts, and all the facts, which bear upon the inquiry? This is the supreme step; for until this is done reasoning is futile, and it may be added that, when this is done, the formation of conclusions is a comparatively simple process. Now mathematical training cannot help to this important preliminary work; it leaves its cultivator to the blind acceptance or blind rejection of his premises. Those, therefore, who have exclusively pursued their studies, *so as to form mathematical habits of thinking*,* have no preparation for the practical emergencies of thought, where contingencies are to be taken into account, where probable evidence is to be weighed, and conclusions from imperfect knowledge are to be formed and acted upon. The pure mathematician is therefore liable to a one-sided and erratic judgment of affairs. An exclusive mathematical discipline must therefore, be held as as actual disqualification for the work of life."

The above was written with reference to the classical course at college and has even a more direct application to the West Point course. In considering changes to be made, it would be well to inquire whether the West Point course is not too mathematical to give the most valuable results in the case of the average officer? If all are to be engineers, well and good, but other-

* The italics are mine.—E. W. H.

wise we are educating a few engineers at the expense of a large proportion of every class. The fighting soldier does not need mathematical formulæ in the customary duties of his office. In the supreme test, war, imperfect and conflicting data must be the officer's guide and the faculties of observation and of judgment will be of more value than mere mathematical reasoning power. Worse still, mathematical reasoning may easily lead into serious error, for if our premises are wrong, we may, by perfectly logical processes, arrive at an absurd result, and this result may be adopted because "it has been proved."

Methods of Instruction.—With the exception of a very limited amount of practical work, as previously noted, and lectures in the physical branches, all instruction at the Academy is by recitation at the blackboard. On this the cadet makes such notes and figures as he desires or as are necessary to illustrate the portion of the day's lesson given him for recitation. Before beginning recitation, the instructor is required to answer any pertinent questions and explain any points which the cadets may not have mastered by their unaided study. The recitation is a presentation of the subject in the cadet's own words, during which time he has the undivided attention of the instructor who makes corrections and explanations in the course of the recitation or at its end. This general method, one of the leading features of West Point, is at once seen to have many advantages, and *for the teaching of abstract science* is probably as good a method as has ever been devised. In mathematics the fundamental and most general properties of matter are all that are taken account of. Pure mathematics is an abstraction, and hence can be taught without reference to natural objects. For example, the square as it is conceived in the brain of the geometrician has no necessary connection with wood or stone or iron. In his mind it is disconnected from all such material objects, and hence its properties can be deduced and discussed better from a diagram than from a square of wood or stone.

But why, it may well be asked, should the same rigid system be applied to the natural and applied sciences where, as in physics and chemistry, natural objects, things, are studied? In the natural sciences the things themselves should be handled, tested, and physical laws and properties of matter illustrated by the student himself in a well equipped laboratory and under the eye of the instructor. Lectures alone can never replace such individual

work. Even if the student does not go over the whole range of science, the knowledge gained by such methods will be a solid acquisition which will remain with him. He learns to know the things themselves and not what some one has said about them. Training in scientific methods of working, a love for the science and a desire for further acquirements are the fruits of such modern methods of teaching. Surely if this be practicable it is vastly better than the old methods of learning Nature from books, where the student, it may be, goes over the whole range of a science and can pass a fine examination but who, on trying to apply his knowledge, is put to the blush by the merest tyro who has had the advantage of some practice.

That such methods are practicable is proven by the fact that in our leading educational institutions, even where, as at West Point, a natural science is studied as part of a general education and not to make specialists, laboratory work forms a prominent part of the course, a very prominent part indeed. Excellent results have been obtained at West Point in cases where even a very limited amount of practical work has been introduced. The subject loses much of its abstraction to the cadet's mind and his interest and real proficiency are materially increased.

No doubt the authorities at West Point will admit the force of these arguments, but whenever the subject is broached, lack of time is pleaded, and the questioner told in effect that while such methods as have been outlined above are doubtless those best adapted to the education of practical men, West Point does not make and cannot be expected to make every graduate a good practical chemist and mechanical engineer. It is further claimed that the abstract and analytical methods of teaching mechanics and natural philosophy that have been in vogue for many years at West Point give a remarkable mental training,—that the mind is greatly benefitted and disciplined by a long course of juggling with equations and producing mathematical transformations. Such deductive methods are adapted only to advanced students, such as have previously obtained an experimental and practical knowledge of the subject and thus understand something of the properties of matter. The average cadet lacks such preliminary training, and thus having little on which to base the course of abstract mathematical reasoning, he is forced to memorize the forms and sequence of equations and in this effort loses sight largely of the principles intended to be taught him.

Prof. Mahan put himself on record as follows: "The defect of our course as a whole, is, perhaps, that we are too abstract, and that there is not sufficient application of the theory and principles that are taught." The Commission of 1860 on the Military Academy reported that they "have further endeavored to remedy the deficiency in practical knowledge, and the power of applying for professional purposes, the scientific knowledge theoretically imparted. This is essential to a thorough apprehension of the course by the student, and to his retention of his knowledge."

Few would desire to see West Point become a merely practical school. No practical school can give the general education demanded of West Point. In any system of general education, theory must be studied to give a broad view and a fairly comprehensive mastery of a subject, but such theory must be enforced and illustrated by practical work if it is to be of much benefit or to produce a lasting impression. West Point graduates should be not only educated men but practical men as well. This desired result can only be attained by proper instruction.

Beyond and besides the mere conveying of information, the true province of an institution of learning is also to teach its pupils how to learn in future, how to work intelligently on any given line, and to instill habits of judicious reading. In these latter respects West Point is certainly lacking. A too exclusive book course in natural science will teach the student to depend too much on books in any scientific or practical work he may undertake. *A fairly comprehensive knowledge of even one science, gained by practical laboratory work, will do more to inculcate a habit of close observation of facts and of drawing correct conclusions therefrom than a smattering of the theories of many sciences and an adequate grasp of none.*

The effects of the excess of theory at West Point are apparent in the service. As an army we are too much given to theorizing, and practice has little attraction for us. The Polytechnic School of Paris has suffered from the same disease and from time to time the subject has received the earnest attention of the authorities. Of those graduates of the Polytechnic who enter the army, the complaint has been that they are too much given to abstractions. It is also stated that a general from the Polytechnic is a rare thing while St. Cyr produces many good generals.

The mental discipline acquired by a proper study of the physical sciences is of a high order, and according to John Stuart

Mill, "there is no intellectual discipline more important than that which the experimental sciences afford." The officer, of all others, needs to have his judgment and powers of observation developed and quickened, and the course of physical science outlined above would certainly have that effect and also give a mental discipline equal to that of the more analytical methods. The question is to arrange the course in accordance with these principles.

The great advances in science have been principally due to or the result of inductive methods of reasoning. From experiment we pass to general principles, and this would seem to indicate the true and natural order of teaching science. As it is obviously impossible for the student to perform for himself all the experiments on which a science rests, a rigid adherence to the inductive method of teaching is not possible, nor even desirable, for persons of the age of the average cadet. It must be combined with the deductive. The text-book here becomes of great use as giving an orderly arrangement of experiments and principles. Let a portion of the theory be studied; then let this part of the text be illustrated by the practical work of the cadet and mastered before going on to the next subject or part. The necessary time will be gained by omitting some reviews and also the merely descriptive parts of the text. When working, the cadet would as far as possible verify the statements of the text. Merely descriptive matter may always be obtained from books, and if required to be memorized will soon be forgotten. Then again, by such methods of work a subject is stretched over a longer period. Now a cadet is hurried through a subject, and before he has had time to fairly assimilate the mass of new ideas, it is dropped suddenly and a new and perhaps quite dissimilar subject is taken up.

In French the avowed object is to give the cadet a good reading and translating knowledge of the language. Here, as in the physical sciences, more would be accomplished in the end by going slower at first. Instead of being required to memorize page after page of rules and exceptions; the sounds of the vowels, dipthongs and syllables should be taught by a daily oral drill. Syllables being made up of letters and words of syllables, it is an easy progression to the proper pronunciation of words and hence of sentences. By first analyzing a word into its syllables, the pupil can thus pronounce it correctly even though the word be

entirely unfamiliar. This system is possible with French because of the general regularity of the language. Between a speaking and a translating knowledge, the latter is certainly of much greater importance to cadets, and both cannot be taught in the time available. Competent critics, however, believe that in the time now devoted to French the cadet can acquire the same translating knowledge as at present and in addition have his ear trained and be taught to pronounce correctly in reading. To do this would require a limited number of native Frenchmen as instructors much after the plan now in successful operation at the Naval Academy. Such native instructors were formerly employed at West Point. Their duties would be to conduct the pronunciation and reading drill as outlined. They would be auxiliaries employed for a special purpose. It is useless for one to try to acquire the correct pronunciation of a language except from those to whom such language is native. To render French into correct English is an important drill in English, and for this and the ordinary grammar, American instructors, on the other hand, are better than foreigners. If then we cannot give a speaking knowledge of French, the course should be such that the graduate would find it easy to acquire a speaking knowledge. In doing so under the present system, he finds that he has the double task before him of first unlearning vicious modes of pronunciation and then acquiring the correct ones, and further, that his ear is entirely untrained. His wrong pronunciation is due to lack of instruction and practice at the beginning. Not having had the fundamental practice in pronunciation of the elements of the language, the cadet unconsciously falls into the habit, when reading, of attributing certain sounds to the words before him. Having no correct standard in his mind, he naturally gives them the sounds he thinks they should have. Although these words remain unpronounced, it may be, the wrong sounds become fixed in the mind and it is very hard to get them out. Had he, from the beginning, learned to read aloud with proper accent, even though slowly, at the end of the course he would have been a long way on the road to a speaking knowledge of the language. In that case his general knowledge of the language would be of the greatest assistance, and a speaking knowledge would follow easily and quickly from practice.

French is now studied and recited in a mechanical way. The method of teaching as outlined above would certainly relieve the

study of much of its present monotony and prove a healthy stimulus to the acquirement of the literature of the language and to a speaking knowledge as the opportunity offered. Such interest and stimulus are now lacking almost entirely. To obtain the best results by the above method the present course in French should be stretched over a much longer period. This can be effected by reciting less frequently.

Overcrowding of the Courses.—One of the greatest burdens under which the Academy now labors is the overcrowding of the courses of study by which the cause of true education suffers. This is much to be regretted and calls for an early and effective remedy.

As long ago as 1860, Professor Bartlett declared of the course of studies: "It is too full for the time, and cannot be taught thoroughly, or with any certainty of realizing for it the ends of education. It is much better suited to a class of students who have had the usual preparation for entering college than for new cadets such as come to the Academy now-a-days, with scarcely the rudiments of common-school instruction."

In 1865, after speaking of the way the course was then limited and defined, Colonel Thayer wrote: "The natural consequence is that the pupil is overtaxed, 'crammed'; more mental food is given him than the mind is capable of digesting. There is too much abstract theory; not enough of the practicable application to impress the theory on the memory, so as to make it durable and practically useful."

General Abbot, in 1883, said "the labor required of cadets has, I think, reached its limit."

These authorities are worthy of the closest attention, not only on account of their high reputations, but because of the intimate knowledge they possessed of the Military Academy and its needs at the time of writing. Since then the course has been slowly but surely increasing in severity. Without going back to the sixties, a comparison of the Cadet Registers of 1878 and 1893 will show a marked and general increase in the course all along the line, not only in every department but in every course of study almost without exception. In some cases new subjects of study have been introduced, and in nearly every department the text-books of 1878 have been added to or re-written and enlarged. To make room for new subjects others are not omitted but crowded into a smaller space of time. The result now is congestion. From the nature of the subject, a rigid comparison cannot be made

without an intimate knowledge of the text-books used, of omissions and additions, and of the relative value of the instruction at the two epochs named. The fact of a marked increase will be apparent to any graduate who has occasion to familiarize himself with the present course. It is also shown in a general way by the grand totals for general merit. In 1878 the grand total was 1950, and in 1893 was 2345, *an increase of about 20 per cent. in fifteen years.* This 20 per cent. scarcely measures the increase in the courses.

Judging from the numbers found deficient on the entrance examinations, the candidates are no better prepared now than in former years. It will not be denied that the cadet of 1878 had set forth before him all he could well accomplish, and now, with the same qualifications for admission and a much harder course, to say that the cadet is much overworked and that he has more set before him than he can master, is only saying what nearly every observant person will admit.

With an overcrowded course of studies it is impossible, even with the best instruction, to bring the lower parts of the class up to the proficiency they should exhibit, thus producing great inequalities. "What is required of the lowest men,—quality and quantity considered,—is only from one-half to two-thirds of what is required of the highest men."

The overcrowding of the course has been progressive, and is due to the expansion of the sciences, particularly of those relating to the art of war, and also to a laudable and very natural desire on the part of each head of department to make his own course as complete and effective as possible. While the increase in any one year may be small, the final result is decidedly large. This condition of affairs is not only bad for the cadet himself, inevitably leading to cramming and its attendant evils, but in the end the Academy's reputation for thoroughness will surely suffer. In former times very little instruction seems to have been given, and the recitation consisted principally in finding out how much the cadet had acquired and in marking him accordingly. With the present increased course more and better instruction is given, but it is a question how much the cadet really gains by the knowledge thus easily acquired. The old system tended to produce better educated men, men of more power. The present system is then, in a degree, a departure from the traditions of the Academy.

The evils attending the overtaxing of the mind have been graphically set forth by Mr. Bain in the following passage:—

"The system of cramming is a scheme for making temporary acquisitions regardless of the endurance of them. Excitable brains that can command a very great concentration of force upon a subject, will be proportionably improved for the time being. By drawing upon the strength of the future, we are able to fix temporarily a great variety of impressions during the exaltation of cerebral power that the excitement gives. The occasion past, the brain must lie idle for a corresponding length of time, while a large portion of the excited impressions will gradually perish away. This system is exceedingly unfavorable to permanent acquisitions; for these the brain should be carefully husbanded, and temporarily drawn upon."

The truth of this famous thinker's statements is confirmed by common observation, and is clearly illustrated in the average West Point graduate. During four years his brain has been overtaxed, and he then relaxes, and three or more years of mental inactivity follow. This is only natural, and the system, not the individual, is mostly at fault. During the period succeeding graduation he should be continually advancing in his profession and in the more polite branches of learning and reading. These years are second only in importance to those just passed at West Point, and if wasted, the loss will be harder and harder to repair as time progresses. He has learned a great deal perhaps, but has not acquired a love of study or habit of judicious reading. Not that books should absorb him by any means, but his development should not be thus suddenly arrested.

The aim of West Point has always been to give the future officer a training in all of the principal branches of the military art, in this respect differing materially from all of the elementary military schools of Europe. In addition to the general reasons making such a course better adapted to our needs, the graduate of early days passed his service on the frontier, remote from books and opportunities of professional advancement. For the largest proportion of the army there was no post-graduate school, and hence the necessity of passing the cadet over as much ground as possible. This necessity, happily, no longer exists. Conditions have changed. The expansion of the sciences and arts has been so great as to make it impossible, with low requirements for admission, to concentrate into a four years' course all there is to

be learned. With changed conditions of service and with post-graduate schools now established for each arm, something must be left to be done after graduation. With full control of the individual's time, both as youth and adult, it is surely not to the true interest of the Government to rush him through his schooling as quickly as possible and then leave him to rust. *West Point will do her full share if she gives her pupils a thoroughly good scientific education and leaves much of the purely technical parts of her present course to be taught at post-graduate schools.*

Methods of Relief.—To relieve the pressure of studies several modes suggest themselves, some which have been put forward at one time or another :

1. *To Raise the Standard of Admission.*—Even if Congress would consent to this, it is at least doubtful if the results would be all that the advocates of this measure hope for. Either general competition from the whole country, as is the method pursued at the Polytechnical School, or general competition in each congressional district, would be necessary in order to get a sufficient number of boys of the requisite qualifications. As under existing law the appointment of cadets is in the President's hands, the competitive mode can be applied to congressional districts without further legislation.

Under the present system, a boy's selection is so much a matter of chance that he can scarcely be expected to prepare himself much in advance. Under the competitive system, and with ample publicity as to date and character of the examinations, boys would prepare themselves years in advance as is the case abroad. In this way a sufficient number of well-prepared candidates would be assured and a class of boys secured for whom the profession has an attraction from the outset. Other things being equal such boys would probably make the best soldiers. The Government does so much for the boy after his admission, that it can reasonably and in justice to itself insist on a standard for admission that would bear some relation to the succeeding course of studies and that would reduce the present heavy expense of keeping many who subsequently fail because of lack of preparation on entrance.

Theoretically the present low standard of admission opens the door to the largest number, but practically we know that the system, as carried out, reduces that number to the comparatively few who know of an approaching vacancy or who can get the ear of

the congressman. It is thus not really as democratic in its workings as a higher standard with general competition would be.

A low standard of admission is not an entirely unmixed evil. The Academy now starts at the bottom and can be sure that the foundation is properly laid for the subsequent course.

2. *To establish a preparatory school for West Point.*—This would amount practically to a lengthening of the course and besides throws a burden on the Government that the parents should bear.

3. *To make the course of studies five years instead of four.*—This has been tried several times. In 1854 the course was made five years, changed in 1858 to four, in 1859 to five again. In 1861 two classes were graduated, since which time the course has remained four years. There was a natural prejudice among the cadets to the five years' course, and time was not given to arrange the course of studies and observe results carefully before the four years' rule was again established.

Two courses were open,—to make the first year a preparatory course, or to let the first four years be much as at present, and the fifth year almost entirely a practical course—during this last year the cadet to be a quasi-officer and to have a considerable degree of liberty. This would necessitate a separate barracks and mess and it was believed that the effect upon discipline would be bad. The principal arguments for the five years' course were based upon the supposition that the Government would never establish post-graduate schools for the various arms. With these schools now fairly established, it is not probable that the five years' course will again be revived. Four years is quite long enough to keep cadets under the strain to which they are now subjected.

4. *While retaining the four years' course, to make a division of the class at the end of the second year*, the upper half to take the full course designed for the engineers, ordnance and artillery, and the lower half a modified and less mathematical course to fit them for the infantry and cavalry. According to Prof. Andrews, the present course is graded for the different parts of the class. In this way the lower sections really pursue a less severe course, and this would certainly seem a sufficient provision. There are several strong objections to a strict division of the class. Such a division would cause a diploma in one part of the class to be more highly esteemed than in another and thus produce invidious and harmful distinctions. Then, as before stated, it is desirable

that all graduates should have passed through practically the same course in order to fit them for the varied duties of our service. A sharp division would also prevent the merited rise of many cadets. At the beginning of the third year the members of a class probably stand more nearly on a footing of equality than at any previous time. During the first two years the previous preparation had full weight; now the cadet's natural ability and staying power come more into play and these valuable qualities should receive full recognition in his graduating standing.

5. *To omit portions of the present course.*—It is believed that Spanish and Drill Regulations can be omitted with positive advantage. They are passed over rapidly, take up considerable time, and are studied by the cadet principally for the marks they give.

Spanish was originally introduced, not for its literature as was French, but for the purely practical object of enabling the graduate to converse with the natives of the then recently acquired Mexican provinces. The speaking knowledge now gained in a brief three months' study of a text-book is negligible, and even if it were otherwise, there is not probably one in twenty of our officers who is ever under the necessity of speaking or reading Spanish. Its omission was strongly recommended as long ago as 1865 by Col. Thayer. Its military literature is not comparable with that of France or Germany, and its possible value in a war with a South American state is not marked enough to warrant its retention in a course where German is not taught and where the time for French is none too long.

From the moment the cadet dons his first uniform the drill regulations are taught him practically and thoroughly. If recitations are needed in addition, they should be on the principles of tactics rather than on a system of set rules, subject to change at any time, and with which every company officer habitually keeps himself informed.

Other subjects of a strictly technical nature might also be omitted and taught better elsewhere, but these two studies are mentioned as more prominent examples of what might be effected in this line.

6. *To entirely reorganize the present West Point course in connection with the higher courses at the post graduate and war schools.*—While any of the previous modes would give a certain measure of relief, it is believed that the last is the only one that would

afford a radical remedy both for overcrowding and other defects and give us what we much need, a connected and thorough system of military education. Such a reorganization demands the most careful consideration and the highest ability, and should be the work of a superior commission clothed with ample powers to carry out its own recommendations after approval by the Government. The commission should be a permanent one. Its appointment and the filling of vacancies from time to time are matters of detail. This commission would reorganize both the West Point and post-graduate courses so that they would harmonize and form a complete whole. Then this same commission, or a similar one, would supervise the whole subject of military education in so far as it relates to officers and cadets. No change of methods, studies or text-books could be made without its sanction and the approval of the War Department.

The need of some such reorganization was so apparent in 1860 that we find two commissions appointed in that year to report on a reorganization of the Military Academy. The first was appointed by the Secretary of War and did not complete its labors, being succeeded by a similar one appointed by Congress. The report of the latter commission was duly submitted but the absorbing events of the Civil War prevented anything further being done.

The plan of reorganization should also include the establishment of a war college where the duties of the staff, the combined use of the three arms, military history, campaigns and strategy could be studied. This would in turn relieve the post-graduate schools. West Point would then give the fundamental education, discipline, and the practical drill exercises, and the post-graduate school would give theoretically and practically the technical knowledge necessary to the effective use of the particular arm and as much of the other arms as is directly connected with that object. To a more limited number of officers the war college would give instruction in the higher branches of the art of war. The war college course would prove a stimulus to the attainment of the necessary qualifications for admission, and would have a powerful effect upon the standard of professional acquirements in the army generally. Each school would thus have its particular functions as part of a comprehensive system. Neither need interfere with the others, and indeed they would supplement each other effectively. The officer's education is by

this means extended over a period sufficiently long to attain the best results, both educationally and professionally.

No effective remedy can be hoped for under the present system. Something in the nature of a superior permanent commission or board is absolutely necessary from the nature of the problem and the conditions which surround it. No one person or temporary body of men can hope to gain the intimate knowledge or experience needed for the work. The present annual Board of Visitors is charged by law to "inquire into the actual state of discipline, instruction, police, administration, fiscal affairs, and other concerns of the Academy" and to report their "views and recommendations" to Congress and the Secretary of War. Their report is thus only a recommendation and carries little weight or authority other than that due to the high character of its members. The report must be considered as an opinion formed from a very superficial examination. No board of visitors, whatever the ability of its individual members, can hope to gain much real insight into the workings of the Academy and its relation to military education in general in the few days allotted, much of which time is given up to official courtesies. Their report is thus necessarily colored by the views of the officers of the Academy, and its principal effect is to aid in securing appropriations for material improvements.

There is now no adequate means by which the opinions and views of graduates can be reflected in the West Point course. The proposed commission, by having a due proportion of graduates, would open the door to such recommendations and views as are the result of service and of observation away from West Point. At the Naval Academy we find that sympathy with the service is promoted by appointing naval officers as heads of departments for a limited term of years. The service and Academy are thus united and progress assured.

POST-GRADUATE SCHOOLS.

The value of the post-graduate schools, or schools of application, has been amply demonstrated, and it only remains to have them recognized as an essential factor in every officer's education. "To deny the necessity of such schools as those at Willet's Point, Fort Monroe and Fort Leavenworth is to deny the plainest teachings of recent wars. To recognize the importance of these institutions is to acknowledge at once that they should receive

hearty support and be established on a basis worthy of the army and the nation. They should have the same recognition by Congress as the Military Academy at West Point."

Necessity has established these schools, and without sufficient appreciation or support they have already done invaluable work. The race for marks and standing, unfortunately, bids fair to injure their true usefulness. Eliminate from these courses marks and standing, and make them true professional and practical schools. Marks may be necessary in the lower schools, but here the only question should be one of proficiency or deficiency in each department. Gross inattention to the subjects of the course should be ample ground for trial by court-martial, and the officer's promotion to 1st lieutenant should be contingent on his passing the course satisfactorily. The Army Register should note simply the fact of his graduation and the year. These several measures would be sufficient to get the best work from the officer without the degrading allurement of marks.

At present probably not more than one-half of the graduates of West Point take a post-graduate course at all, and the engineer and artillery officers are the only ones to whom such courses can be said to be strictly obligatory. The Infantry and Cavalry School has not sufficient accommodations for all in those branches who would naturally go, and the result is that a large number do not go at all. The Engineer School is the only one taking the graduate at a fixed time,—in this case upon leaving West Point. The artilleryman goes to Fort Monroe when his turn comes or he is not on other duty to interfere.

It is certainly not best to send the officer direct from West Point to his post-graduate school. He then has no real relaxation and there is a decided tendency to make him too bookish. On graduating at West Point all officers should be assigned to the line for two years. This assignment would not be a rigid one, and just before going to his post-graduate school the officer should be allowed, with proper limitations, to choose his arm definitely and finally. Besides giving in some cases a variety of service, this plan would correct errors of original assignment. Although it is immaterial how the first assignment is made, on this final assignment to arm of service the preferences of the individual should govern as far as possible, on the principle that an officer will do the best service in the arm of his own selection, *after a fair opportunity of judging.*

These two years may be made very profitable as well as enjoyable. The young officer now gains an acquaintance with the army, rests from his books and is broadened by contact with the world. During this period he should have practice in minor tactics and field operations with troops, and should learn *practically, and under a regular system,* the company and post administrative duties. *The teaching of these matters belongs properly to the army and not to West Point.* Criticisims of West Point are not infrequent to the effect that the cadet should be taught how to make out the various company and quartermaster papers, to do this and to do that. Such critics lose sight of the true functions of the Academy. A continuance of the same reasoning would require that the cadet be also taught all the various duties that may fall to his lot up to his captaincy at least, and would leave little for him to learn after graduation. The attempt is now made to teach some of these administrative duties by lectures, but a young graduate recently said that he learned more about company administration in a few hours passed in the company office than in all the time he had spent at West Point in attending lectures on the subject and writing them up. This is another case of learning to do a thing by doing it.

Promptly and certainly at the end of these two years the officer should be sent to his proper post-graduate school. *Nothing should be allowed to interfere with this programme.* We may expect that he is now as well or better prepared to profit by the course than at any previous or subsequent time. This, of course, would require that a class be admitted each year, and would be provided for in the general reorganization.

It may be urged that the time advocated for the schooling of an officer is too long; that "while the officer should always be a student, he should not always be a pupil." But we must remember that the cadet begins his West Point course with practically no preparation,—at least not with what would be considered preparation for a college course,—and in four years his education is considered complete. The plan here outlined does give a longer schooling, to be sure, but it is a definite period and at a time of life adapted to produce the best results. At the end of this time the officer's schooling is finished and he does not have a school course forever hanging over his head. The European officer goes through preparatory schools almost from his childhood before taking the course corresponding

to West Point. The thoroughly educated professional man must, after he has acquired the common-school branches corresponding to the entrance examination at West Point, spend several years preparing for college, then four years at college and from two to four at his professional school. Then only, after from ten to twelve years spent in preparation, does he begin the active practice of his profession.

The great military necessity for the United States is to have at hand an adequately trained body of officers to command future armies. If our volunteers, as we believe, are individually superior, then should our officers be likewise superior. The higher the average of intelligence in the rank and file, the greater the necessity for a high standard of knowledge and efficiency among the officers. As a first step towards creating such a body of officers, it is easily practicable to increase the annual number of graduates of West Point and discharge such as are not needed to fill vacancies. These graduated cadets, though lacking the experience of actual service, could be relied upon in time of war. The number now graduated barely suffices to fill vacancies, and the country is not getting the full returns it has a right to expect. While it is impossible to keep the corps up to the full legal strength, it is easily possible to materially increase the number of cadets. West Point should not rest satisfied but should make strenuous efforts to have the classes kept filled. Undoubtedly one cause of the small classes is the failure of candidates to pass the moderate examination required for entrance. This is probably due to defects in the methods of selection, so that even if a boy desires to enter West Point and has fully prepared himself, he cannot have even a reasonable certainty of securing the appointment, and the prize may be carried off by a boy who had never given a thought to entering West Point. Competitive examinations with publicity as to date, requirements, etc., would do much to overcome this defect. Another great cause of the deficient numbers is the failure of congressmen to nominate, or what amounts to about the same thing, failure to nominate a sufficient length of time ahead. On failure of a congressman to nominate a cadet, say a year in advance, the President could exercise his legal prerogative and fill the vacancy by appointing some one from the district. If these measures would not suffice, it is believed that the appointing power now virtually exercised by congressmen could be assumed by the President, and rules

established that would secure a sufficient number of well-prepared candidates. There is no doubt of there being boys enough who would do themselves credit at West Point if means were taken to get them.

The main body of scientific military knowledge naturally resides in our regular officers. One of the chief duties devolving upon our small regular army to-day, one of the principal reasons for keeping it on foot, is that it may conserve and develop all that is best in the military art, and be prepared to diffuse this knowledge and make it quickly available for our raw levies. This matter of proper education and training of our regular officers is almost entirely in the hands of the army, and if new legislation is needed, it would probably be easily forthcoming if any earnest and concerted effort were made to improve our present system. It is to the permanent part of our forces,—to the officers,—that the fostering care and attention of the Government should be directed in this matter. Individual efforts avail little. Our efforts must be combined and systematized if any material advance is to be made.

A system like West Point, which has accomplished such good results in the past, and which has been built up by such distinguished talent, should receive the utmost consideration consistent with a proper regard for the best interests of the army and the country at large. West Point's past is secure. Her graduates and friends should now be made to see and feel that she is looking forward and not backward, and that the spirit of tradition and of conservatism will not henceforth prevent her from taking and keeping her rightful place in the educational future.

Briefly stated, West Point tries to do too much in the time at her disposal considering the limited acquirements of those entering; antiquated methods of instruction prevail in some departments; the expansion of the sciences has caused her to overcrowd the courses to the detriment of true education; and West Point, the army, and the post-graduate schools must divide the field, the courses be harmonized and the officer's education stretched over a greater length of time. In proposing changes in our present system of military education, methods are here advocated whose value and results are known and tried, and, moreover, the changes suggested are, it is believed, such as can be applied practically and with the happiest results.

REFORM NEEDED IN THE PAPER-WORK OF THE QUARTERMASTER'S DEPARTMENT.

By 1st Lieut. ALFRED M. PALMER, 24th U. S. Infantry.*

IN writing of needed reform in army paper-work, there are three axioms that may be stated in the beginning:

1. That routine in the public service invariably leads to devitalization.

2. That reform in the methods of a department seldom originates at the head, and that it must be looked for "from the circumference and not from the centre of the circle."

3. That it is useless for a writer to attack old and fossilized methods, no matter how pernicious they may be, unless he can offer, as a substitute, something which is clearly and manifestly better than that which he assails.

Too much of our military literature is devoted to attacking alleged army abuses, and too little to showing how real abuses may be remedied, and for the reason, no doubt, that it is so much more easy to tear down than it is to build up.

In writing upon the subject of this paper I approach it without diffidence, and with apologies to none. Thirteen years' experience in the Quartermaster's Department convinces me that reform in its paper-work is badly needed, and if there be one to say that it is presumptuous in a line officer to suggest improvement in the methods of a department to which he does not belong, and of which as a line officer he can know but little about; it is sufficient answer for me to ask him to look abroad in the land; look over the one hundred and ten military stations throughout the country where troops are serving; where the expenditure of millions of dollars for the service of the Quartermaster's Department is initiated; where the bulk of the department's property is received, cared for and issued; where the practical workings of the department are best understood, and where the burden of the department's labor rests, and he will find that of the one hundred and ten stations *eighty-seven* have local quartermasters from the cavalry, artillery and infantry, thirteen

* Read before the Post Lyceum, Fort Huachuca, A. T., March 29, 1894.

from the Ordnance Department, and nine from the Quartermaster s Department.

It is not to be denied that the Quartermaster's Department has made wonderful strides forward in the way of its equipment in late years, but on its business methods routine has fallen like a blight. In this the department has been running in the same old grooves for years, and whenever an attempt has been made to pull out of the ruts and get on better ground, it has invariably resulted, so far as I can see, in its getting deeper and deeper in the mire, until the department is now floundering in a quagmire of useless paper; and should we have a war of any magnitude to-morrow, the whole system would be hopelessly swamped, and no doubt would have to be abandoned. This, at least, is my judgment after many years of practical work in the department.

The department seems unable to realize that what is needed is consolidation and consequent simplification of its papers, and not, as has been the rule heretofore, expansion with an increased classification of property and with it a long train of useless abstracts and vouchers, and I want to say here that it is on the line of the army that the burden of this cumbersome system rests,—the place least able to bear it. I repeat that it is on the line of the army, and on the line quartermaster, that the real burden of this false system rests. I am not writing of the broader question of administration, but of method and detail.

I believe I am justified in saying that with the exception of the superior officers exercising administrative control, and those in charge of the larger depots, the duties of officers of the Quartermaster's Department, not on duty with troops, are not to be compared with those of line quartermasters at our larger military posts.

I have served as post quartermaster at different stations for about eight years, and as purchasing and shipping quartermaster at the headquarters of a military department for several months, expending thereat about one hundred and sixty thousand dollars of the public funds, and I believe that my superiors will admit that I did my work well, personally supervising every detail as it came up, and I can truthfully say that the work at this station with its attendant responsibilities costs me less labor, mental and physical, than a tour of the same length at the smallest post at which I ever served as quartermaster, and where the expenditures were less than one-fiftieth of the above sum.

There is a good reason for this; in one case the officer must go into the thousand and one details to initiate the work of the department of a military post, and generally with the poorest of clerical help, while in the other case the officer's work is clearly mapped out for him, and all he need do is to follow well-defined lines, and with a corps of trained clerks to aid in the work.

Now, it is by these officers at the bottom that the obsolete methods of the department are most felt, and to whom we must look for improvement if it is to come. The head of the department is too far removed from the working details of the department to expect him to initiate needed reform, and as I said in the beginning it must be looked for "from the circumference and not from the centre of the circle."

In other words, it is the galled jade that will wince, and the kick must be expected from that quarter.

Assuming, then, that I am qualified to write on the subject, I shall deal with the property-papers only in this paper, and shall begin with one of the most glaring absurdities in the department, namely, the method used in making sales to officers and in issuing fuel, forage, straw, illuminating supplies, stationery and horse medicines to the army.

To make good my claim that the method is an absurdity I shall use the papers made up to cover these sales and issues at Fort Bayard, New Mexico, during the fourth quarter of 1888–89.

The garrison was made up of three troops of the 10th Cavalry, and the headquarters and band and three companies of the 24th Infantry.

The following are the papers:

39 Requisitions for fuel, etc. (Form 38) in uniplicate, and 3 in duplicate	45 papers
3 Sales Vouchers (Form 33½) in duplicate	6 papers
3 Statements of Forage expended (Form 36), in duplicate	6 papers
Abstract G (Form 36), in duplicate	2 papers
20 Requisitions for Stationery (Form 41) in duplicate	40 papers
Abstract H (Form 40), in duplicate	2 papers
2 Requisitions for Horse Medicines (Form 51)	2 papers

Making a total of 103 papers to do the work as stated.

Army officers are all more or less familiar with these forms, but to appreciate the work requisite to make up this number of papers it is necessary to get the forms and examine them in bulk; this being done I ask an examination of Exhibit "A" of this paper.

Here is found *an exact record* of all sales and issues of the stores referred to, made in April, 1889, the first month of the quarter, consolidated on one form made in duplicate, and the two papers covering the work embraced in *fifty-one* of the papers actually used to do the work of the month as follows:

Vouchers to Abstract G; 2 Forms 33½, 15 Forms 38, and 2 Forms 39 ..... 19 papers
15 Vouchers to Abstract H (Form 41), in duplicate..... 30 papers
2 Vouchers to Abstract L (Form 51) ..... 2 papers
Making a total of 51 papers as stated.

In my judgment, it will be manifest to any one who may give the subject even superficial study, that three of the vouchers I propose made in duplicate, or a total of six papers, would have covered the entire ground included in the one hundred and three papers used to do the work of the quarter as previousiy shown, and the interests of the Government would have been fully as well protected.

Now, can anyone, military or non-military, give a reason why these stores should be divided into three classes requiring abstracts and vouchers for each?

The allowances of all are fixed by Army Regulations, or the issues controlled by the officer who orders them made; the quartermaster is held responsible that the allowances are not exceeded; the stores are all borne on the same return, and to say that they should be split up into three classes, with abstracts and vouchers for each, in order to simplify the work, which was probably the original intention, is to insult the commonest kind of business sense.

Let us see how the present method works in practice: On the first day of a quarter a troop commander wants these stores; he makes requisition on Form 38 for fuel, forage, straw and illuminating supplies; on Form 51 for the horse medicines, and on Form 41 for the stationery. The first and second go to the commanding officer; the first for consolidation, the second for approval, and the third goes direct to the quartermaster; when they all reach the quartermaster they are abstracted on G, H and L.

What information does the fuel requisition convey to the commanding officer when it reaches him? Simply the strength of the organization and the number of horses.

Now, the commanding officer has this data in the best possible form,—his Morning Report.

After the requisitions have been consolidated and sent to the quartermaster, what do they show? Simply the number of men and animals, and this is as it should be, as the quartermaster is the one to decide the kinds of fuel, forage, etc., to be issued.

As to horse medicines and stationery, the regulations provide tables of allowances and organizations may draw the entire allowance if it be necessary to do so, and the quartermaster is held pecuniarily responsible that the allowances are not exceeded.

What more is needed to protect the interests of Government than that the commanding officer have the blank form I offer, and that organizations send him a letter, a simple letter, at the proper time asking that the regulation allowance of the various stores be issued to them for the time required, specifying the quantities of horse medicines, etc., provided a less quantity than the allowance is desired? The commanding officer is to fill up the blank as he now consolidates the fuel requisitions, filling in the quantities of horse medicines when necessary, and the quantities of oil, matches, etc., where these expenditures are in his discretion, leaving all other spaces blank to be filled in by the quartermaster when issues are made.

I repeat, for the sake of emphasis, *that the regulations provide the allowances, and the quartermaster is held pecuniarily responsible that the allowances are not exceeded.*

Should troops arrive at the station during the month, or stationery be required for use of boards of survey, courts-martial, etc., application is to be made for the stores as outlined, the paper to be referred to the quartermaster for issue and entered on Exhibit "A," and at the end of the month all such papers can be compared and destroyed by the commanding officer as is now done with Ration Returns in the Subsistence Department.

By this means no contingency could arise at a military post requiring more than three of these forms in duplicate during any one quarter; the first voucher of the quarter to cover horse medicines and stationery for the whole period, provided it should be thought best not to make a monthly issue of the whole.

As to sales, a book should be kept in the quartermaster's office where officers may certify as to purchases much as they now do on the sales blank, provided the certificate is necessary to protect the interests of Government, which I doubt.

This book to be inspected monthly by the post commander, and by the department inspector when necessary; the aggregate

of the sales and the money value only to be shown on the form as indicated in Exhibit " A."

Now, see what this one form would mean in the saving of paper and labor.

Take Fort Bayard as an average post. As stated, it took one hundred and three forms to drop these stores during one quarter. There are one hundred and ten stations, if I mistake not, from which quartermaster's returns are rendered, not including headquarters of military departments and the depots; then there were 103 × 110—11,330 papers required to do this work throughout the army in one quarter, or 45,320 during one fiscal year.

With the form I suggest there would have been 2640, *a saving of 42,680 papers* in issuing stores which might be dropped with safety on a tabulated certificate of the quartermaster, approved by the commanding officer, if those in authority could only be made to think so.

It is well to look at these things in the aggregate, as it is the only way in which their magnitude can be appreciated.

Let us consider the other abstracts and their vouchers and see if they may be simplified:

D. This in my judgment is the only abstract needed with the property-return. It is simply a tabulated statement of purchases, requiring no vouchers, and it puts the items of purchase in as good shape for accountability as any paper which can be devised perhaps.

E. This abstract embraces stores received from officers. It should be abolished and its vouchers entered directly in the property-return for reasons which will be stated further on.

F. I can seen no shadow of an excuse for this abstract and its vouchers since General Orders Number 6, A. G. O., of 1891, was issued. Officers coming in possession of quartermaster's property not on their returns are required to take it up on this abstract and its vouchers, itemizing it under the different headings of found at post, previously issued and not consumed, manufactured, etc.

The General Order referred to requires the quartermaster to take an accurate inventory of property on hand at the close of each quarter, and he is required to sign a cast-iron certificate that he has taken the inventory, and that he has taken up on his return all surplus property found. What more should be required of the quartermaster than that he take up all surplus property as certified to, and file the certificate as a voucher? What matters

it to Government where the property comes from, provided it be public property and that it be duly accounted for? Let it be understood that if the quartermaster does not want to take the property up, no number of abstracts and vouchers will make him do so.

If the Quartermaster-General requires statements of manufacturers at points like the Leavenworth Prison, let them be special for these places.

G., H. and L., with vouchers 33½, 38, 39, 41 and 51. These papers should all be replaced by Exhibit "A" of this paper, or some modified form of it, if preferred.

I. This abstract should be abolished, and the List of Expenditures and its other vouchers should be entered directly in the return.

A word about stores for expenditure. So far as my observation goes the method used in making up the List of Expenditures is more or less of a sham; but assuming that an exact account is kept of all these stores as they go out, and that the monthly list represents the exact quantities expended, what good purpose does the paper serve when made up? It can be of no possible use to the quartermaster until the time comes to make his property-return; then why not make one paper cover the whole period?

If it be said that the paper may aid in showing the quantities of stores on hand when making requisitions, etc., I answer that it is a poor quartermaster who will fish out of the different pigeonholes all the papers necessary to show the quantities of stores on hand, when he can step into his store-house and get the data by actual count in half the time, and with far less labor. Besides this, the book of expenditures will give the data as well as the monthly list. This List of Expenditures, then, should be made to cover the whole period covered by the property-return.

K. This abstract should be abolished and its vouchers entered directly in the property-return, for reasons shown further on.

As to the property return I had this to say about it in an article published in the *United Service Magazine* for April, 1893. I said: "There are needed,

"1. Two property-books, one for quartermaster's stores, the other for clothing and equipage; their headings to be entered as in the present returns, except that in the book for quartermaster's stores each heading should have two columns, one for quan-

tity, the other for cost,—the latter for handy reference in making up inspection reports and data often called for. The book for quartermaster's stores to have blank headings for the average number of articles on the returns throughout the service, which would be about six hundred. The book to be accompanied by blank sheets similarly headed and ruled for use at stations having a greater number of articles than the average. In the centre of each page of the book to be left a horizontal space three-fourths of an inch wide, which would be the dividing line between stores received and those issued, and on which should be pasted half-sheets uniformly ruled, and used when necessary; an example of their use is shown in the illustration farther on.

"In this book, and above the blank space, to be entered stores received from all sources as soon as verified, the number of the vouchers to be entered only on such pages as contain articles embraced in the vouchers,—*i. e.*, each page to be independent of all other pages, except the first, which must embrace all vouchers showing names of invoicing officers, dates, etc.

"Below the centre space to be entered all stores issued, in their appropriate columns, as soon as the issues are made and the vouchers completed, that the quartermaster having the debit and credit sides of his account before him may strike his balance at any time and see how the account stands.

"These entries, above and below the centre-space, to go on throughout the period for which a return is to be rendered and at its close, a balance to be struck showing quantities on hand; then a true transcript from the book to be made on a form similar in all respects to the book, except that it need not have the columns for cost of articles, and with a set of vouchers complete forwarded to the Quartermaster General. The book to take the place of the retained return, and, with a set of vouchers complete, form a part of the Government records of the post or station. There is no good reason why officers should carry around with them, at great expense to the Government, thousands of pounds of retained property-papers, when they may be equally well protected, and errors more readily corrected, by leaving them at the station where prepared.

"The return is made up in the above form.* Page 1 of this return shows two of the half-sheets in place, *they fold back*

* Exhibit B is omitted as it is believed the writer's description of the property-book and return is sufficiently comprehensive to be understood without its aid.—ED.

EXHIBIT "A."

Statement of Forage & Straw issued to & consumed by the Public Animals at Ft. Bayard, N. M., Apr. '89.

DATE OF ISSUE.	No. of Animals Present.		DAILY ISSUE AND CONSUMPTION.						No. of Animals Absent.		REMARKS.
			Oats.	Corn.	Barley.	Bran.	Hay.	Straw.			
	Horses.	Mules.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Horses.	Mules.	
April 1, '89.	1	33	88	177		44	476	113			
" 2, "	1	33	88	177		44	476	113			
" 3, "	1	33	88	177		44	476	113			
" 4, "	1	33	88	177		44	476	113			
" 5, "	1	33	88	177		44	476	113			
" 6, "	1	33	88	177		44	476	113			
" 7, "	1	29	88	177		44	476	113			
" 8, "	1	29	88	177		44	476	113		4	4 Mules to Ft. Cummings, N. M.
" 9, "	1	29	88	177		44	476	113		4	
" 10, "	1	33	88	177		44	476	113		4	
" 11, "	1	33	88	177		44	476	113			4 Mules from Ft. Cummings, N. M.
" 12, "	1	33	88	177		44	476	113			
" 13, "	1	33	88	177		44	476	113			
" 14, "	1	33	88	177		44	476	113			
" 15, "	1	33	88	177		44	476	113			
" 16, "	1	33	88	177		44	476	113			
" 17, "	1	33	88	177		44	476	113			
" 18, "	1	33	88	177		44	476	113			
" 19, "	1	33	88	177		44	476	113			
" 20, "	1	45	119	239		59	644	153			12 Mules received from Depot.
" 21, "	1	45	119	239		59	644	153			
" 22, "	1	45	119	239		59	644	153			
" 23, "	1	45	119	239		59	644	153			
" 24, "	1	45	119	239		59	644	153			
" 25, "	1	45	119	239		59	644	153			
" 26, "	1	45	119	239		59	644	153			
" 27, "	1	45	119	239		59	644	153			
" 28, "	1	45	119	239		59	644	153			
" 29, "	1	45	119	239		59	644	153			
" 30, "	1	45	119	239		59	644	153			
TOTAL.			2,981	5,992		1485	16,128	3,991			

ST. LOUIS JAN 20 1903

Requisition for Fuel, Forage, Straw, Illuminating Supplies,

BY WHOM, OR FOR WHAT PURPOSE REQUIRED.	PERIOD.			NUMBER OF									FUEL.										
													Wood.									Coal.	
													Soft.			Hard.			Kdlg.			Bitu-minous.	Anthra-cite.
	From	To	Days.	Co onels.	Lt. Colonels and Majors.	Captains.	Subalterns.	N. C. Staff, &c.	N. C. Officers, Privates, &c.	Civilian Employes.	Private Horses.	Public Horses.	Mules.	Fires.	Cords.	Feet.	Inches.	Cords.	Feet.	Inches.	Cords.	Feet.	Inches.	Pounds.	Pounds.
	1889																						
Field and Staff, and N. C. Staff	Apl. 1	Apl 30	30	1	1	1	2	5			8				8	6	"	"	"	"	"	"	"	
N. C. S. and Band, 24th Infantry	"	"	"					4	17						11	7	8	"	"	"	"	"	"	
Post Hospital and Hospital Corps	"	"	"			2			8		3			12	42									
Company A, 24th Infantry	"	"	"			1	2		49						14	2	4							
Company D, 24th Infantry	"	"	"			1	2		45						13	1								
Company F, 24th Infantry	"	"	"			1	2		49						14	2	4							
Troop D, 10th Cavalry	"	"	"			1	2		64		6	46	8		18	5	4							
Troop L, 10th Cavalry	"	"	"				1		61		2	43	10		17	6	4							
Troop M, 10th Cavalry	"	"	"			1	2	½	8		4	45	6		17	6	4							
Civilian Employés Q. M. Dept	"	"	"						61						4		8							
Detachment 24th Inf. at Saw Mill	"	"	"						13						3	6	4							
Detachmt. 24th Inf. at Ft. Cummings, N. M.	"	"	"						4						1	1	4							
Q. M. Agent at Silver City	"	"	"											2	3	4								
Officers A. A. Q. M. and A. C. S	"	"	"											3	5	2								
Offices Com. Officer Pt. Adj. & Adj. 24th Inf	"	"	"											1	1	6								
Room of Military Courts and Boards	"	"	"											1	1	6								
Library, School and Reading Room	"	"	"											1	1	6								
Chapel	"	"	"											1	1	6								
Guard House	"	"	"											6	10	4								
Gymnasium	"	"	"																					
Work Shops, Q. M. Dept	"	"	"											3	5	2								
Pumping Works	"	"	"												52	4								
Sales as per List on page 6	Apl. 1	Apl 30	"												21	2	8	4	6	8				
Expended in Bakery (Savings)	"	"	"												6									
Expended as per List on page 1	"	"	"																					
Required															277	2	4	4	6	8	"			
On hand to be deducted. Q. M. to take up here articles in poss. of org. on 1st day of mo.															277	2	4	4	6	8	"	"	"	"
To be supplied																								

I certify that the above requisition is correct and just; that the articles required have not been previously drawn for any part of the
tually owned and kept by the officers of my command, in the performance of their official military duties, being on duty with the

I certify that during the month of April, 1889, I issued all the articles enumerated in the above requisition, and that the issues

Matches, Stationery, and Horse Medicines

FORAGE.					STRAW.			FOR LAMPS.							FOR LANTERNS.				REMARKS.
Oats.	Corn.	Bran.	Hay.	Fodder.	For Bedding.	Mineral Oil.		Wicks.	Chimneys.	Fonts.	Valves.	Valve Corks.	Burners.	Chimney Holders.	Wick Tubes.	Wicks.	Globes.	Burners.	Matches.	
lbs	lbs	lbs	lbs	lbs	lbs	galls	oz	no	no	no	no	no	no	no	no	no	no	no	boxes	
823	1646	411	3360		800	5	80	2	12										12	The authority for issues not provided for in Regulations should be given. The kind of coal issued, and its equivalent to a cord of wood, should be stated. Where expenditures of oil, matches, etc., are at the discretion of the commanding officer, the quantities to be filled in at his office.
						1	40	1	3										3	
						10	10	2	12										18	
308	616	156	1260		300	20	20												24	
						8	68	2	12										12	
						8	68	2	12										12	
						8	68	2	12										12	
5966	11932	2982	25200		6000	10	10	2	12										12	
5400	10800	2700	23100		5500	10	10	2	12										12	
5503	11006	2751	23100		5500	10	10	2	12										12	
						1	46	1	3										9	
						1	46													
						4	34	2	6										24	
						4	34	2	6										24	
						12	102	2	18										12	
						28	88	2	24										12	
						17	32	2	12										12	
																				Authorized by the Quartermaster General.
						210													12	
					3791															
	140	730	500																	
2681	5992	1485	16128																	
20981	42132	11215	92648		21891	374	44	28	168										234	
20981	42132	11215	92648		21891	374	44	28	168										234	

for the Garrison at Fort Bayard, N. M.

BY WHOM OR FOR WHAT PURPOSE REQUIRED.	PERIOD. From	To	Days	STATIONERY. No of Animals.	Foolscap Cap Paper. qs	Letter Paper. qrs	Legal Cap Paper. qs	Envelope Paper. qs	Blotting Paper. sh	Envelopes. no	Paper Fasteners. bx	Blank Books. no	Black Ink. bt	Red Ink. bt	Wafers. no	Sealing Wax. oz	Steel Pens. no	Note Paper. qs	Lead Pencils. no	Office Tape. pcs	Mucilage. bt	Rubber Pieces. no	Pen Holders. no	Foliopost Paper. qs	Memo. Blocks. no	Memo. Blank Books. no	Rubber Bands. gr	Rulers. no	REMARKS.
	1889																												
Troop M 10th Cavalry..	Apl. 1	June 30	1 qr	55		6		¼	10	80		1	1	1		3	20		1	1	1	1	1						
Troop D 10th Cavalry.....	"	"	"	60	1	5		¼	10	80			1	1		3	20		1	1	1	1	2						
Troop L 10th Cavalry..	"	"	"	55		4	2	½	10	80			1	1		3	20		1	1	½		2						
Company A 24th Infantry.....	"	"	"		2	2	2	½	10	80			1	1		1	20		1	1	1	1	1						
Company F 24th Infantry.....	"	"	"		2	4		½	10	80			1	1		3	20		1	1	1	1	2						
Company D 24th Infantry.....	"	"	"		2	3	1	½	10	80			1	1		3	20		1		1	1	2						
Headquarters 24th Infantry	"	"	"			6	4	¼	24	150			2	1			40		3	2	1½	1							
Post of Fort Bayard, N. M. ...	"	"	"			5	5	¼	24	150			2	1			40		3	2	1½	1	3						
Maj. F. T. Van Vleit, 10th Cav.	"	"	"			3			5	40			1			2	12		1	1	1	1	1						
Chap. A. Allensworth, 24th Inf.	"	"	"			2		⅛	5	30			½			1	6		1	½	½		1						
1st Lieut. H. W. Hovey, 24th Inf.	"	"	"			2			5				1	1					1										
1st Lieut. P. E. Trippe, 10th Cav	"	"	"			2				30							6						1						
Board of Survey	Apl 25	Apl 25	1		2	4	6		16	74			1	1			6	4	4	1	1	1	3						
Garrison Court Martial	Apl 25	Apl 25	1			½	1			25							6		2										
Garrison Court Martial.....	Apl 27	Apl 27	1			2	2		4	24	12/12						6		6		1		1						
Expended in Q. M. Office.....																												Non Expend for Q M Office in last month of the quarter	
Received					9	50½	23	2½	133	1003	1/12	1	13½	10		19	242	4	27	11½	12	9	20					1	
On hand to be deducted.....																													
To be supplied					9	50½	23	2½	133	1003	1/12	1	13½	10		19	242	4	27	11½	12	9	20					1	

Issued during the Month of April 1889.

HORSE MEDICINES AND DRESSINGS.

Acid, Carb. Cryst.	Aconite, Tincture of	Alcohol	Aloes, Barbadoes	Ammonia Aro. Spirits of	Ammonia, Carbonate of	Ammonia, Solution of	Belladonna, Extract of	Camphor	Cantharides, Powdered	Charcoal, Powdered	Cosmoline, Veterinary	Ether, Spirits of Nitrous	Ether, Sulphuric	Flaxseed Meal	Ginger, Powdered	Gentian, Powdered	Glycerine	Iron, Sulphate of	Iron, Chloride of	Lunar, Caustic	Oil, Linseed	Opium, Tincture of	Oil, Olive	Pepper, Cayenne	Potassa, Nitrate of	Soap, Castile	Soda, B. C.	Sulphur, Washed	Turpentine, Oil of	Zinc, Sulphate of	Bandages, 2½ in.	Bandages, 4 in.	Oakum	Silk for Ligatures	Sponges, Coarse	Sponges, Fine	REMARKS.
lb	oz	gal	oz	lb	lb	gal	oz	lb	oz	lb	lb	lb	lb	lb	lb	lb	oz	oz	lb	oz	gal	lb	gal	lb	lb	lb	lb	gal	oz	No.	No.	lb		lb	lb	
15	4	2	20	"	1½	2	6	1½	3	"	8	6	3	30	3	3	12	6	20	1	2	1	2	1½	1½	15	4	3	3	4	1	1	"	⅝	⅝	"	The A. A. Q. M. will issue these medicines to the Vet. Surg. 10th Cav., for use of public animals at post.
15	4	2	20	"	1½	2	6	1½	3	"	8	6	3	30	3	3	12	6	20	1	2	1	2	1½	1½	15	4	3	3	4	1	1	"	⅝	⅝	"	

time above charged, and that the private animals for which forage is required are actually owned and kept by myself, or in the field, or at military posts or stations. Z. R. BLISS, Col. 24th Inf. Comd'g.

forage to public animals, and the expenditures of stationery in the Q. M. Office were necessary, and for the good of the service.
ALFRED M. PALMER, 1st Lt. and R. Q. M., 24th Inf. A. A. Q. M.

(OUTSIDE FOLD.)

EXHIBIT "A."

VOUCHER No.

RETURN OF

Quartermaster's Stores

FOR THE

Fourth Quarter, 1888-89,

—BY—

1st Lieut. ALFRED M. PALMER,

R. Q. M. 24TH INF., A. A. Q. M.

—AT—

FORT BAYARD, N. M.

REQUISITION FOR

FUEL, FORAGE, STRAW, ILLUMINATING SUPPLIES, STATIONERY AND HORSE MEDICINES REQUIRED BY

THE GARRISON.

ISSUED IN APRIL, 1889.

	ARTICLES.	$	cts.
4	Cords of Hard Wood	14	50
21	" " Soft "	34	11
140	lbs. of Corn	2	17
500	" " Hay	4	75
730	" " Bran	11	46
210	galls." Mineral Oil	37	80
		$104	79

I certify that the above is a true exhibit of the sales of Q. M. Stores to Officers at Fort Bayard, N. M., in April, 1889, as shown by the sales book; that the Officers making the purchases have certified that the animals for which forage was purchased were owned by them, and that all purchases made were for their own use.

I further certify that all entries and issues made on the within requisition since April 1, '89, were made on my warrants which have been compared with the requisition and found correct.

Z. R. BLISS,
Col. 24th Inf. Comd'g.

I certify that I have taken up on my Account, Current for April, 1889, the sum of $104.79, received from the above sales.

ALFRED M. PALMER,
1st Lt. and R. Q. M., 24th Infantry.
A. A. Q M.

upon each other. In entering invoices of stores received, the upper half-sheet is put in when the upper half of the page is filled, folded down, and the vouchers continued down the page until the half-page is filled; then it is turned up, the totals brought over, and the vouchers continued down the page until all are in.

"In making issues the lower half-page is filled, the half-sheet added, and the totals carried to the top of the half-sheet; the vouchers are continued down the half-sheet, summed up, and carried to the opposite side, *the half-sheet being turned up for the purpose;* the vouchers are then continued down the page until all are in, when the totals are carried back to the body of the return to the line 'total issued,' etc. This work will rarely have to be done except on the first page. The use of these half-sheets is the only possible objection which can be offered by the uninitiated against my method of making up property returns. It may seem to such that so many of these half-sheets would be needed that the return would be cumbersome and unwieldly. Such is not the case in practice. Every quartermaster knows that his business is confined almost exclusively to fuel, forage, illuminating supplies, stationery, horse-medicines, and the stores for expenditure, the great mass of articles of office and barrack furniture, means of transportation, the tools and property of various kinds, and post-property remaining practically unchanged from year to year. From the nature of the work it is impracticable for any great number of vouchers to appear on any one page, and the half-sheets are provided, not because they will often be needed, but to cover emergencies.

"I venture to say, and I say it with an experience of twenty years in army-paper work behind me, that if my suggestions should be adopted by the War Department, and the abstracts eliminated and the vouchers consolidated, as suggested, and entered directly in the returns made of 17×22 paper, with horizontal lines three-sixteenths of an inch apart, which is ample, not one military station in the country (the large purchasing-depots excluded) will have one half-sheet to add for any one quarter, and not more than two for any one year; this exclusive of the first page."

Property-returns are rendered more often than the interests of the service demand, and a change looking to fewer returns would do more towards lifting the paper burden from the army than any other one measure which could be adopted.

With present methods the office of the average post quarter-

(OUTSIDE FOLD.)
EXHIBIT "A."
ARTICLES. $ cts.

master is in a turmoil nearly one-third of the time getting these returns off, and I have served at large frontier posts where the clerical help was poor, and where the outside business of the department was practically suspended for twenty days during the quarter, while the office was grinding out these property-returns.

An officer of the Quartermaster's Department, in an excellent article published in a recent issue of the JOURNAL OF THE MILITARY SERVICE INSTITUTION, suggests that the property returns be rendered twice a year instead of quarterly. I believe that once during a fiscal year is as often as they should be rendered. Be this as it may, I claim that the method of making the returns and vouchers which I propose, or something of a like nature, is the true way to make them up when rendered, *i. e.*, use the property-book as outlines; consolidate the vouchers within a reasonable limit; do away with the abstracts, and make the return serve as the abstract by entering the vouchers directly in it.

I claim that it is practicable to do this, no matter what the volume of business may be, and no matter whether the return be for long or short periods. *Consolidate and simplify the work, make the returns cover a reasonably lengthy period, and the problem is solved.*

Inexperienced line officers are often placed on duty in the Quartermaster's Department at large posts, and they are appalled at the beginning with the enormity of the responsibility involved, and the intricacy of the paper-work, and fearing pecuniary loss, set themselves to doing that which should be left to a clerk, leaving the really important work of the department in the hands of subordinates.

They may complete the tour of duty without loss to themselves, but it is safe to say that valuable public property has sifted through pilfering fingers when it might have been taken up and saved to Government if properly looked after.

Two incidents in my experience will serve as cases in point.

At one time I relieved an officer as quartermaster at a frontier post where the wood to be had in the vicinity was of poor quality, and finding him about one hundred cords short of his accountability, which had to be covered by a board of survey, I naturally felt uneasy and gave particular attention to the receipt of the wood, personally measuring each rick, and as many small ricks had to be made owing to irregularities in the ground, marking and numbering all ricks, and keeping a record of their issue, so

that no fraud could be perpetrated in the delivery of the wood. From the outset I saw that, if properly looked after, surplus wood must accumulate. I was liberal in the issues of wood, giving the troops all they could consume, and at the end of a tour lasting less than three years I had taken up *about nine hundred cords of surplus wood.*

The secret lay *in seeing that the Mexican sub-contractors turned in their ricks but once.*

At another time I relieved an officer as quartermaster, and among other stores transferred to me were several ricks of hay. The records of the office showed the weight of each load which was supposed to have gone into the ricks, and the officer gave me his certificate that from the records of the office, and to the best of his knowledge and belief, the ricks contained the quantities transferred to me.

I accepted the hay, but from the start it was plain that something was wrong, and a board of survey had to be called in to adjust matters. The board evidently believing that the fraud had been perpetrated in the delivery of the hay, held me responsible for a part of the loss because I had not used more care in receiving the hay from my predecessor. The department commander set the proceedings aside and ordered another board which relieved me from all responsibility on the same evidence acted on by the first. The Government, however, sustained a serious loss. *The weighing had been done by a subordinate.*

I mean no invidious comparisons in making these statements, but give them to show that excessive paper-work diverts the officer's attention from the most important part of his work, and while he is making an honest effort to protect his own interests as well as those of Government, he unconsciously leaves a loop-hole open through which fraud creeps in.

Both these officers are hard working, conscientious men, and I had the statement from one that his office work was such that he could not possibly attend to all the outside details of the department and must necessarily trust them to subordinates.

The matter of loss to Government is one of the strongest reasons why the papers of the Quartermaster's Department should be simplified.

On the line quartermaster rests the responsibility for the care and safety of millions of dollars worth of property, his clerical help is poor as a rule, and instead of hampering him with a busi-

ness system which is as false as it is cumbersome, the department should offer him every facility for doing his work in a common sense business way; not only in justice to the officer, but for its own credit, and as a means of protecting the interests of the Government.

The department owes it to the army, it owes it to itself, and it owes it to the Government, that it shake off the devitalizing influence of routine, and that it pull out of the mire and on to solid business ground.

The Quartermaster's Department is not the only department of the army whose paper-work is far in excess of the needs of Government, and the Secretary of War who shall take the matter up and handle it with a firm hand, and who shall place army business on a sound basis, will leave such an impress on the army as has not been felt since the days of Edwin M. Stanton.

RECRUITING AND PHYSICAL TRAINING IN THE BRITISH ARMY.*

By Lieut.-Col. A. A. Woodhull, Deputy Surgeon General, U. S. A.

RECRUITING.

AS is well known, the British army is maintained by voluntary enlistments. The physical conditions for acceptance as a soldier vary greatly within certain general limits for different branches of the service, and they are also changed by orders from time to time for the same corps. The medical officer is responsible for the measurement of the height, chest and weight of the recruits, and for their age being in accordance with the army schedule. At present the requirements for the mass of the army are: minimum height, 5 feet, 4 inches; weight, 115 pounds; age, between 18 and 26 years; chest measurement, between 64 and 66 inches of height, 33 inches; 66–70 inches of height, 34 inches; above 70 inches, 35 inches. These points will be taken up presently.

While not directly bearing upon the duties of medical officers as such, the question of maintaining a large army without compulsory service is of interest; and some of the formalities wherein the British methods differ from our own are worth study. When a candidate offers reference as to character, the recruiting officer uses a form of polite inquiry to the referee, asking five questions: Capacity in which and for what time known; when last seen; character as to sobriety, honesty, and respectability; previous service in the army, militia or navy; married or single,—with space for answers, the paper to be returned. The man is then served with a notice by a non-commissioned officer requiring him to attend at a specified hour and place "for the purpose of appearing before a justice to be attested for Her Majesty's Army." This notice explains to the recruit under eleven distinct headings the conditions of service, so far as the division of the twelve years for which he engages is concerned. Men may enlist for twenty-

* From "Observations upon the Medical Department of the British Army" by the author, published in the proceedings of the Association of Military Surgeons. Vol. IV. 1894.

one years or long service; or, as generally done, for twelve years or short service. The twelve years are divided between the colors and the reserve, into 3 or 7 with the one and 9 or 5 with the other, as they elect. At the end of either period they may reëngage. He is also told on the notice that he may be discharged within three months of enlistment on the payment of not more than £10. The back of the notice contains eighteen questions to which he must reply on enlistment, and false answers to any of eight of these as to apprenticeship, marriage, imprisonment and military service, render him liable to two years' imprisonment with hard labor.

Upon his attestation (enlistment) which is effected by a civil magistrate, not a military officer, he signs the answers to these eighteen questions and declares they are true, and his signature is witnessed. He then takes the oath of allegiance to the crown, and of obedience to Her Majesty and to the "Generals and Officers" set over him, and his signature is again witnessed.

Then follows the certificate of the justice that the questions were read to the recruit who "understands each question" and that he has signed the declaration and the oath in his presence, giving place and date. The questions point, among other matters, to the particular parish where he would become entitled to support, if necessary, and one, "Are you willing to be vaccinated or re-vaccinated?" is at once unusually precise and recognizes a popular prejudice.

A negative answer stops the enlistment. I do not suppose that at the large recruiting offices, as in the great cities, the reference as to character or the formal notice of attendance is specifically carried out, but that the applicants are taken up for examination as expeditiously as possible.

Also, of course, the physical examination and the inspection by the recruiting officer are completed before the man is brought before the magistrate for the questioning and the formal oath which completes the enlistment.

The medical officer is charged with determining that the intelligence of the recruit is sufficient and that his physical condition is sound. The chief variations from our own methods of examination are: 1. Chest measurement. To obtain this the tape is placed so that the upper edge lies immediately below and touches the shoulder blade and the lower edge touches the upper part of the nipple, the arms hanging loosely and the surface not com-

pressed. This position of the tape gives a larger apparent capacity than by our method. When the tape is thus applied, the recruit counts slowly from 1 to 10 and the circumference noted at 10 "is to be considered the correct chest measurement." It is also spoken of as the minimum measurement, and it is directed that the maximum expansion of the chest should also be taken and be recorded as a denominator, as 33–35.

Fractions less than half an inch are not to be noted. Although both sets of figures are to be recorded, the so-called minimum is that upon which the recruit's acceptance depends. This is not reached by forcible expansion and, as just pointed out, the situation of the tape gives a larger record than with us. Chest mobility therefore plays no necessary part. It results that men are accepted who are below our standard. 2. Vision is determined by dots instead of by test-types. 3. Should the recruit present no satisfactory evidence as to age, the medical officer will decide his age and note him as "physically equivalent to" so many years and months. But the man's own statement is taken as his official age, and he is entered as such on the public documents.

4. The minimum weight, 115 pounds, is below our standard. 5. There is no minute search for and record of distinguishing marks, such as we now use to expose fraudulent enlistments and to identify deserters. A record of the more conspicuous marks only is made, as in our older fashion.

The attestation paper, which is the most important document both for the army and the man, connected with the soldier, consists of four large papers and is made in duplicate. The first page is filled with the eighteen questions and answers, the recruit's declaration and oath, and the certificate of the magistrate or attesting officer. It is the enlistment paper, properly so so-called. On the second page are noted under the heading Description: Age physically equivalent to (so many years and months), height, weight, chest measurement, complexion, hair, religious denomination. Marks are noted in an adjoining space. This would be the basis of a Descriptive List, although no such additional paper is prepared. Should the medical officer think the man has served before, he attaches a slip of paper to that effect, unless the man acknowledges it.

Succeeding is a certificate of medical examination, to the effect that the recruit presents none of the disqualifications enumerated in the regulations, that his vision with either eye is

as required, that his heart and lungs are healthy, that he has free use of his joints and limbs, and that he declares that he is not subject to fits. Then follows the simple statement "I consider him fit (or unfit) for the army." "Fit" and "unfit" are the simple and universally employed terms by which the qualification of the soldier is expressed at almost every point of his career. The recruiting officer then follows with a certificate that the recruit was inspected by him and that he considers him fit (or unfit) for the service in the (regiment or corps) and that due care has been exercised in the enlistment. Following this is the approving field officer's certificate, that the attestation is correct and properly filled up and that the required forms appear to have been complied with, and "I accordingly approve and appoint him to the (regiment)." The man's destination is fixed at once.

The enlistment of men who do not agree in physique with the standard requirements is provided for on a form that gives a brief description of the man. The officer commanding forwards this, with his reasons for recommending the application, to the Adjutant General, at the Horse Guards, where it is authorized or disapproved. When authorized, that paper is attached to the attestation, and the deficiencies or other variations from the standard are thus condoned. It is my understanding that these 'special" enlistments very frequently occur.

The third page of the attestation paper is arranged for a statement of services as to corps, changes in grade, dates with special reference to service not allowed to reckon for fixing the rate of pension, and that in the Reserve not allowed to reckon toward good conduct pay, each entry to be certified by an officer. This is in extension of the descriptive list idea.

The fourth page is the man's Military History Sheet. This, which is totally distinct and different from his Medical History Sheet, is arranged to show his service at home and abroad, by country and time. It notes the military school through which he passed, if a boy; certificates of education; passed classes of instruction; campaigns; wounded; effects of wounds; special gallantry; medals; decoration, etc.; deferred pay, issued and refunded; name and address of next of kin; particulars as to marriage, giving the woman's names, whether spinster or widow, date and place, names of officiating minister or registrar and two witnesses, and date when placed on the married roll; particulars as to children, giving Christian name, date and place of birth, date

and place of baptism and name of officiating minister. Each of these entries is certified by the initials of an officer. The entry of "next of kin," which appears on the descriptive list of our own Marine Corps as "name and address of nearest relative or friend," is a point that might be adopted on our descriptive lists, in one form or the other, with advantage to both the Government and the soldier.

All the original attestations are not sent to a central office, as might be anticipated, but are distributed among twenty groups, each of which has a distinct place of deposit, but none is sent to the headquarters of the army, the Horse Guards. Consequently there is no common place for comparison or reference. The duplicates go to the man's commanding officers and accompany them at home and abroad. All incidents affecting the man's enlistment, appointment or deprivation as to rank or pay, conviction by civil authority or court-martial, and his whole service at home and abroad, are to be entered thereon as they occur. The duplicate attestations are sent at the beginning of each year to the custodians of the originals for checking, so as to preserve them in accord.

The attestation paper is practically an original enlistment paper and descriptive list combined, with the account of pay and clothing omitted. The duplicate replaces our Descriptive Book, and, in the absence of muster rolls prepared at regular intervals and containing the data that we enter upon them, the originals at these diverse headquarters serve that purpose. Each man's record is thus separate and distinct, instead of being crowded between those of others and reiterated from six to twelve times a year; or as sometimes is the case, passing to the rolls of different companies by transfer and to different parts of the same roll by promotion or reduction. But while our own system involves much clerical labor, I failed to learn how the accuracy of this multiplicity of separate papers and their security are maintained during really active campaigns of considerable duration. There is no second physical examination, at the depot or elsewhere. As soon as a soldier is assigned to a corps, he is given a regimental number which is never changed. Nor in the case of death or discharge is a number once assigned bestowed upon another man. In all documents pertaining to the soldier the number invariably precedes the name. Should a man going into action wear his number on a metal tag suspended about his neck as a

scapular, he could be determined with the aid of his regimental marks without difficulty. This I believe the Germans do.

The numbers are given in sequence, authority to commence a new series being obtained as 9999 is approached. The Royal Artillery and the Royal Engineers are extended ten and three times as many respectively. An assumed name under which a soldier may enlist cannot be erased from his papers. He may, if he desire, certain formalities being accomplished, follow his assumed name by his true name as an alias.

The Medical History Sheet of a recruit is prepared by the approving medical officer at the time of examination. Only such physical marks are noted on it as have a professional interest. This goes forward with the attestation to the commanding officer of the man's corps, by whom, when the man's regimental number is inserted, it is given to the medical officer in charge of the station hospital. The details of this paper and its disposition have already been described. At every place where recruits are examined Recruits' Registers are kept, which may not be removed from the place of examination. Registers of Recruits, a different book, are kept by officers commanding regimental, auxilliary, artillery and recruiting districts. Recruits' Registers require the particulars to be fully stated under each of the following heads, whether the recruit is found fit or unfit: Date, regiment or corps, name, apparent age, years, height, inches, weight, pounds, chest measurement over the upper part of the nipple, inches, marks of vaccination or small-pox, place of birth, subdivided into parish or county, or country if abroad, England, Ireland, Scotland, British colonies, foreign countries, trade or occupation, state of education, subdivided into well educated, can write, can read only, cannot read, primary inspection, secondary inspection, transfers from the militia, each of the last three being divided into fit and unfit, whether previously served, remarks as to cause of rejection, and any distinctive marks, with the medical officer's signature.

An Annual Return of Recruits is furnished to the principal medical officer by the medical officers in charge of recruiting.

The principal medical officer prepares a summary of these which he sends with the original to the Director General. I believe these are numerical, not nominal.

PHYSICAL EXAMINATION OF OFFICERS.

The responsibility for the fitness or unfitness of candidates for commissions in the army rests entirely with the Medical

Boards. But they are not to reject eligible candidates for shortness of stature or other slight physical defect. If a candidate can read Snellen's D=6 at 6 metres or 20 feet, and D=0.6 at any distance selected by himself, with each eye separately, he will be considered fit as to vision. If he cannot read with each eye separately without glasses D=36 at 6 metres, *i. e.*, if he have not 1.6, normal vision, although he may be able to read D=0.6 at some distance, he is unfit. If he can read with each eye separately D=36 at 6 metres without glasses, but not beyond, and the defect may be corrected with glasses so that he can read D=0.6 with one eye and at least D=12 at 6 metres with the other, and at the same time can read D=0.8 without glasses at any distance he may select, he is fit. Squint, color blindness, or morbid condition subject to aggravation or recurrence, of either eye, rejects.

PHYSICAL TRAINING IN THE COMPANY AND IN THE GYMNASIUM.

The great importance of physical development is fully appreciated in the British army. The term "physical training" is limited in the technical sense to the exercise in the company that we still call "setting up," and its motive is said to be to expand the soldier's chest and to develop his muscles. This is divided into nine exercises, and begins with swinging the arms in circles. The next is to bend and stretch the body, then to bend and stretch the arms, then the lunge and engage, next bending and stretching the knees. The sixth exercise is a combination of the second and fourth. The seventh is one of four practices for the development of the shoulder by striking out. The eighth is a union of the fourth and seventh, and the ninth is a combination of the whole. These may be practiced singly or in squads, or by company; and they are adapted to music, whose use is encouraged. For a part of them it is recommended that airs with choruses be chosen and the men are allowed to sing the chorus, and they are encouraged to sing through the whole of the eighth exercise. It is officially set forth that the exercises are not to be carried to the point of fatigue, and that they should be varied and be made very short, to avoid fatigue and lack of interest. This is to be practiced constantly, at all seasons of the year and under all circumstances, up to the age of 35 years.

I give no more minute description, because the whole matter

is detailed in the Infantry Drill of 1889, an easily accessible book. In my judgment these exercises are better adapted to the purpose of symmetrical development, are simpler and are more attractive to the soldier than our later drill; and since they are good, I see no reason that their foreign origin should bar their adoption. The regulation, "attention" which is the point of departure, and to maintain which is one of the objects in view, is practically identical in both armies, except that with the English the feet make an angle of 45° instead of 60° as with us.

Notwithstanding inferior material, there is no question that the British soldier looks better on duty, and as a soldier is more active than our own. To the systematic gymnastic instruction now in force, which is an amplification and an extension of the physical training proper, they are much indebted for this superiority.

The Gymnastic Instruction is required for all young officers of the line (in our sense of the word) and for the men. There are two principal gymnasia in Great Britain; at Aldershot, and at the Curragh, near Dublin. The parent one is at Aldershot. These are employed not only for local use, but for training non-commissioned officers as instructors in gymnastics. A gymnasium is supposed to be in operation at every station.

The gymnastic training of the cavalry recruit is carried on simultaneously with his foot drills, and he begins no riding until this course, which lasts two months and must not be interrupted, is finished. It occupies one hour a day.

The infantry recruit begins directly after completing his physical training with the company, which usually is one month after joining. The course is an uninterrupted one of six weeks, an hour and a half daily. Recruit officers are to undergo the same course and at the same time, unless found efficient and properly excused. Weak and awkward men are kept under this training for three months, and if below the standard of efficiency at that time they are then to be reported to the Adjutant General.

Besides training the recruits, gymnasia are maintained to harden and strengthen the trained soldier, so that at least he may cover 1000 yards rapidly and then be in condition for efficient bayonet work. To do this with as little interference as possible with the ordinary military duties, men, according to the size of the gymnasium, but not exceeding one-sixth of the garrison, are to be selected and strictly examined medically. These are then

put into squads for attendance one hour on alternate days, not exceeding three months. Guards are not to be interfered with. Men under thirty must attend, but with men over thirty the course is optional, subject to the medical officer's approval. Voluntary classes for advanced work may be formed, but no man may join them until after one month's instruction.

Medical officers serving with regiments that have undergone gymnastic training "will specially report on the effects of such training on the muscular development and health of the men on their leaving the station, and as to the general influence of gymnastics in producing a vigorous constitution." They are to visit frequently the gymnasium and witness the measurements of the recruits on entering and completing the course. The principal medical officer is to refer to the subject in his annual sanitary reports, giving the substance of the information supplied by the medical officers, and his own remarks on the utility of the gymnasium.

The gymnasium building at Aldershot is not perfectly adapted, on account of size and some minor matters, for its purpose, but the work done in it is admirable. The apparatus is of the simplest description and the floor may be cleared without delay. Parallel bars, light Indian clubs, light dumb bells, a vaulting horse, inclined ladders and the like are all. Using these, but more particularly using them with care, very capital results are obtained. The young men develop in chest-girth and muscle, the weak gain strength, the awkward agility, and the timid confidence. One side of the room is arranged with very trifling foothold for perpendicular escalading, up which men scale successfully, and at one end of the room is a shelf about eight feet from the floor, which men are taught to reach without other help than they can give one another. The ease with which every exercise is performed is delightful to witness. The impression received in watching these exercises was that men with no special physical gifts were brought up rapidly and without distress into admirable condition, and that their military efficiency was greatly increased thereby. It was evident that the men themselves appreciated and enjoyed the work. The system used is a modification of the Ling method, developed by Sergeant-Major Noakes, Chief Instructor of Gymnastics in the army, known as "free gymnastics with light dumbbell drill." It is practiced on the floor of all the gymnasia, and the company "physical training" closely follows it. The testimony of

good observers is that this method improves the carriage and condition better than the older way. Besides the gymnasium training of the recruits and the older men, there are semi-annual classes at Aldershot and the Curragh of non-commissioned officers to be fitted as instructors of gymnastics. These men, sent from various regiments on their own application, are given a more thorough course and develop into skilled gymnasts; but their work, like that of all the rest, is done gradually and without strain. I saw at Aldershot some beautiful examples, in the open air, of running in fours over obstacles, such as hedges, ditches, along the string pieces of bridges whose floors had been torn up, and scaling high wooden and brick walls. These central schools sending out classes of instructors uniformly trained, enable every gymnasium to be conducted in substantially the same manner. And such work as I observed at Dublin seemed animated by the same interest and the same energy. Before going abroad I saw, in 1891, at the recruiting depot, Davids Island, elementary gymnastics taught under unfavorable conditions, in a method so similar to that observed in England that I am confident that the instructor was trained at Aldershot. So simple and efficient a method deserves introduction wherever there is a garrison, and a shelter can be found or made.

The whole gymnasium system is directly regulated by an inspector of gymnasia, and each gymnasium is under the command of a superintendent. An annual class of officers for instruction to fill these places is held at Aldershot, which is an additional guarantee of uniformity. Before the men are allowed to commence the course, a strict medical examination is made of each, and his height, chest, forearm, and upper arm are measured in the presence of the superintendent. These measurements are repeated at the end of the course or when he returns to duty, and the particulars, with the age and weight of the man, are entered in the prescribed books kept at the gymnasium. I think the facts justify the official declaration of the character of the exercises, that they "are so arranged that, while the most advanced course is sufficient to test the powers of the strongest, the preliminary course can be performed without injury to the weakest frame."

Besides the general gymnastics, the cavalry recruits are given a course of instruction in fencing, one hour a day for thirty days, and then a course of single-stick drill one hour a day for forty days. Before being allowed to compete for swordsmanship prizes

in the riding school, every trained soldier must go through an annual course of single-stick one hour a day for six days. Every encouragement is given to keep up this practice voluntarily, and the instructors are enjoined to pay special attention to the men attending during voluntary hours.

Young cavalry officers on joining are required to take the same course as recruits in these matters and the same is required of young infantry officers at stations where there are gymnasia. I have seen them at Aldershot under training on the same floor and at the same time as recruits.

A regulation requires the art of swimming to be taught as a military duty at all stations where there are facilities, and at bathing parades the skilled swimmers are distributed as instructors.

Athletic games, comprehended under the general term of "sports" are systematically encouraged in the army. The public competitions are made gala days for the regiments concerned, and military equipment and supplies are provided for the occasion. The sports are looked forward to with interest and participated in with zeal, and the officers and their families and the men of other regiments are present in large numbers as applauding spectators. This wise interest has a most stimulating and healthy effect. This physical development of the soldier, in whom the fighting instinct is naturally strong, gives to the British army much of the formidableness it possesses, notwithstanding certain deficiencies in the original material and other incidental conditions of the service.

ARTILLERY PRACTICE AT SHOEBURYNESS.

By G. L. A.

AT the mouth of the Thames river, and lying close in the north angle which the river makes with the great German sea, lies Shoeburyness, where the British service accomplishes under a single administration all that is attempted at Fort Monroe, Indian Head and Sandy Hook for the United States. It shares with Sheerness on the opposite bank the reputation of one of the foremost gunnery schools of Europe to which regular officers are sent for practice and inspection service. It furnishes, also, a large proving ground, where guns, gun carriages, projectiles, explosives, armor plate and all other munitions intended for both the royal army and navy undergo preliminary test. Here, too, is the camping place of thousands of artillery volunteers who come every summer from London, Lancashire, Essex, Cork, Middlesex and other parts of the kingdom for the combined purposes of drill, association and an outing. In this way the name of the little fishing town of Shoeburyness, otherwise unknown, happens to figure prominently in the blue-covered literature of the English military service which gives the reports of daily gun practice and manœuvres by regulars and volunteers, and of the processes and results of gun tests and experiments with whatever is new or proposed or uncertain regarding artillery material.

There are in the permanent defense a dozen batteries of from two to six guns each, possibly a hundred store, shop and laboratory rooms in one-story buildings, a long line of officers' quarters and barracks for about five hundred regulars and employés. Extending north from the works and lying almost adjacent along the sea-shore are the grounds of the new experimental station purchased by the government about three years ago. All buildings, machinery and equipment necessary for carrying on the work of the station are of the most modern and substantial design and furnish one of the many testimonials of the skill and good judgment of officers of the British military and naval services to be seen about London.

At the time of my visit in August, 1894, fifteen hundred ar-

tillerymen—officers and men—were temporarily encamped in Sibley tents. The regular work of the garrison was for the time suspended and attention given to getting the guns and equipment in readiness for the visitors and even to superintending the drills and the order of both kitchens and tents.

The drills began at six in the morning and continued until seven o'clock at night with only such interruptions as resulted from the changing of detachments at a piece. The drill of each detachment usually lasted three hours and there were few rests. Firing at fixed targets was carried on continuously from three batteries, while numerous drills at loading and firing occurred elsewhere; at other places there were mechanical manœuvres in dismounting, transporting and mounting of guns of various sizes.

For firing practice the three fixed targets were at distances varying from one to one and a half miles from shore. Each was square-shaped—nine by nine feet—like a small-arm target in appearance, and constructed by nailing black canvas to an upright frame supported on a buoy of logs. Although anchored fore and aft the buoy would occasionally be deflected by a striking shot or a change in the direction of the tide, so that to an observer on shore the target would sometimes appear narrow. It always stood in the centre of an extensive area marked out by a line of floating logs, also anchored, and outside of this area at a safe distance lay, throughout the firing, a steam launch for the purpose of marking the fall of shots and supplying to a six-oar rowboat a party which repaired the targets. The floating target, somewhat larger than the fixed, was A-shaped and likewise painted black.

The guns mostly used in the target practice were the 64-pounder, 6.6-inch and 10-inch rifles. All of the firing appeared to be fairly accurate; possibly every seventh shot of the 6.6-inch piece struck the horizontal target at the distance of one mile, but the percentage of shots which tumbled and of shells which exploded prematurely or failed, appeared large.

The piece was served in the most direct and expeditious manner. In contrast with the experience of our own gunners, there is evidently a time in the life of Tommy Atkins when he ceases to load-by-the-numbers-load and when he begins to serve his piece in the same business-like manner in which a sailor reefs a mainsail. It is a pleasure to watch him at his work. The British

gunner is skillful as well as active and it is wonderful to see how sudden and complete is his transformation into an effective cannoneer from a swell of Piccadilly, who seems to walk on air and to bend backwards in his efforts to be straight. You would not recognize him in the two places as the same person. At drill the chief of detachment gives the commands,—load, ready, fire —with clock-like regularity and each man performs his part without interference or confusion, like any one of the wheels of a clock.

Centrally located with reference to the firing batteries, and in full view of all of them, is an observation house erected on a wooden trestle about seventy-five feet above the level of the sea. Here were stationed the observers and recorders who were furnished with a Watkins range-finder, wind-vane, anemometers, barometers, time-piece and signalling apparatus. Very little is known, and still less is told, respecting the improved form of Watkins' instrument. The means and methods of observing the direction and force of the wind, the pressure of the atmosphere and of plotting the positions of falling shots, fixed objects and moving vessels are similar to our own, excepting, of course, the use of polar coördinates in mapping from the results given by the depression apparatus.

The means of intercommunication between the observing and other stations and the batteries or between the various batteries are different. Three kinds of signals are used, one of which is the flag, wig-wagging the English Morse. Another, wholly mechanical, consists of two large clock faces, but with angular divisions painted on the outer sides of the elevated observing station which face the batteries. By means of long, light, radial arms moving over the faces like the hands of a clock, the observer within the station transmits to the batteries the angles of azimuth and elevation to be given the pieces. The third means of communication is by a small telephone exchange of the simplest description from whose central station wires radiate to every battery, independent detachment, observing stations, commanding officer and other important points. A simple magneto-transmitter supplants the carbon transmitter at all stations, and over the short distances of the defense articulation is sufficiently distinct. A single Le Clanché battery at the central station enables all calls to be made, and here a corporal to operate the switchboard and an orderly to convey messages to points where wires do not run, are constantly on duty. The telegraph is not employed.

The feeling of rivalry which occasionally appeared in the ordinary drills and the more deliberate target practice grew evidently stronger in the mechanical manœuvres. Competitions were constantly going on and many prizes were offered to encourage them. One of the manœuvres which was accomplished on very rugged ground consisted in dismounting a 64-pounder, weighing nearly three tons, from a garrison standing carriage by parbuckling down the side of the carriage. The gun was then moved in the same way along the platform through a narrow passage to a certain point. It was next run upon a sleigh, again transported a few yards and dismounted. From the platform the gun was then raised upon a new carriage by means of long skids and rollers and finally left in the line of fire. Some of the detachments accomplished the manœuvre in twenty minutes; one performed it in little more than fifteen minutes. At the finish on a cool day, the men would come from the drill looking much like firemen out from a burning building and their enthusiasm, skill and pluck were not less than may be seen at the annual meeting of the Yale and Princeton elevens.

Another of the competitions took place on the proving grounds by the field artillery, who, with four 16-pounder breech-loaders, fired at a moving target representing a small number of men in infantry formation. The four guns were in two sections of two guns each and each gun detachment had six men. The battery commander had his section officers, who must not be above the rank of captain. The officer must ascertain the range and fire fifteen rounds of shrapnel shell with time fuses. Common shell with percussion fuses are also allowed for getting the elevation. Considerable skill is required not only by the officers but also by the men. Points are allowed for hits, drill and discipline.

One of the manœuvres was with disabled ordnance: A 16-pounder rifled muzzle-loader gun is on a carriage which is drawn by four horses. There are ten non-commissioned officers and men, including two drivers, who must not drive in two detachments. The team is trotted round the segment of a circle from one point to another. The near gun and limber wheels are exchanged at the latter point, and the gun trotted again a similar distance. It then comes into action, fires two rounds of case-shot at ten dummies placed at about 200 yards; then limbers up, and the trotting recommences to the original starting point, but round the

opposite side of the circle to that from which it started. Halfway on its road the shafts are shifted from double to single draught. The near wheel and off lead horses are considered disabled, and the shaft horse is driven from limber, lashing being used as reins, the near leader hooked in lead, and the lead driver mounted.

Another competition took place in heavy artillery group firing with 64-pounder rifled guns. The firing was at fixed targets at sea and the groups which compete consisted of a fire commander, a group officer, an observer and two gun detachments. The scheme is that when the umpire gives the fire commander one of the three targets with its approximate distance from the battery, the latter must use his own judgment and ascertain whether or not the distance given is beyond or short of the actual distance. He directs the guns to be laid according to his own estimate of the distance. If his estimate is correct, shell is fired to verify it; after this each group is allowed nine rounds to be fired in twelve minutes.

The new proving ground is a long, level tract, one-half mile wide, and offers more than three miles of unbroken and nearly straight seashore. At the extremity of this stretch, next to the town and fortifications referred to, are mounted the heavy guns undergoing test. They stand close to each other for the most part on ordinary chassis carriages pointing in the general direction taken by the beach. Among the carriages there were only two of the disappearing type, and they were intended for small calibres. Over the guns is erected a heavy steel work supporting a travelling derrick of 120 tons capacity. All guns and carriages intended for the English army and navy are built at the great manufactory of Woolwich on the river, ten miles below the centre of London. Such of them as are to be tested are brought down the river on scows to the Shoeburyness dock, from which they are transported by a government railroad over a distance a little less than one mile to the reach of the derrick.

The few buildings near the guns are well-built, one-story structures containing stores, batteries, apparatus, etc., used in the experiments. Pressures are taken by means of copper discs, and initial velocities with a particular form of Boulengé constructed in London. For clock chronographs, electro-magnet registers are in favor. All of the preparations necessary for a thorough inspection in regard to pressures, velocities, flaws, gaug-

ing, recoil of carriage, variation of pressure, and so forth, had evidently been as carefully considered as they were thoroughly carried out. Every important measurement is in some way, directly or indirectly, checked. The British, as well as other services, is indebted to Major Holden, R. A., for modifications of the chronographs to give independently concordant results and for the disposition made of the various apparatus. To equalize the currents in the two circuits of the Breger he has substituted German-silver wire for the graphite resistance many years ago abandoned; he has dispensed with the circuit-closer at the knife ; the disjunction is accomplished by means of an electro-magnet ; the brass frames of both magnets which hold the rods are slit longitudinally and the circuit-breaker of the distant small-arm target is quite new and ingenious.

All line wires are aërial. At terminal stations the circuits are deftly led indoors through multiple-cored cables and it would be difficult to find anywhere in commercial use an electric system more simple and permanent in construction or more certain in action than the one in existence at this artillery post. In the English service, the telephone, or an open circuit telegraph having a Bell telephone for receiver, is regarded with favor as a means of communication between distant points.

Notwithstanding the improvements which have been brought to range-finders, especially in this service, it is evident that, in order to determine accurately distances to objects in the harbor, the main reliance is still placed on the long horizontal base line and two azimuth instruments at its extremities. On the new grounds close to the water's edge stone observation houses, not elevated, have been recently erected. The roof has but one slope and two of the four sides are solidly built of masonry. The side next the water has a long horizontal opening, about a foot wide, which is closed by a shutter when the instruments are not in use. The opposite, or fourth, side is of glass.

Great value, however, seems to be attached to the Watkins position instrument carefully preserved in one of the towers of the Woolwich Artillery College for officers. The secret of its details, and improvements recently brought to it, are well kept, and more knowledge is obtainable regarding the service circuit-closer regulator and watching relay of the fixed torpedo service at Chatham. There will be found in damp and sunless casemates what is probably the best equipped electrical laboratory of any

military service. The various shops, the royal torpedo system and service—everything but the casemates—are interesting and deserve a separate notice.

NE BIS IN IDEM.

By Captain ALFRED C. SHARPE, 22d U. S. Infantry.*

Acting Judge-Advocate, U. S. A. Gold Medalist, M. S. I.

ONE of the latest and most instructive writers on American Constitutional Law† declares that Congress, like Parliament, has been so jealous of military power that while a soldier who has been guilty of an offense against a citizen or another soldier may be sentenced by a court-martial for the act considered as a breach of military rules he is still amenable to the civil authorities and may be made answerable before a jury for the violation of the laws of the State where the act was done. And further, he affirms, an officer or soldier cannot, therefore, be placed beyond the reach of the common law by convening a court-martial and directing it to try the case, nor will an acquittal or conviction by such a tribunal be a bar to an indictment, the *reason being* that although the act is one, there are two offenses and each jurisdiction may take cognizance of *so much of the injury as is peculiar to itself.*

This principle has been repeatedly enunciated by the courts‡ and has been applied to military cases by eminent authority on military law, Judge Advocate-General Holt having maintained

* Read before the Denver Branch, M. S. I., October 11, 1894.

† Hare's Am. Const. Law, 935.

‡ "A person living under two governments or jurisdictions, as does every inhabitant of the States of this Union, may commit two crimes by doing a single act—one against the State and the other against the United States. And in such case the conviction or acquittal of the one crime, in a *forum* of the State is no bar to a prosecution for the other in a *forum* of the United States. Deady, J., U. S. v. Barnhart. 10 Sawyer, 497.

In his Essay on Military Law, pp. 153-4, Tytler says: "It follows therefore that no crime for which the common or statute laws of the country have provided a punishment is cognizable before a court-martial; nor can the military power interfere to prevent the punishment of any soldier guilty of such offenses or supersede by any judicial procedure in a court-martial, the ordinary effects of the laws of the country, unless in those extraordinary cases in which the legislature may find it necessary to proclaim martial law."

that the civil court may legally take cognizance of the criminal offense involved without regard to the fact that the party has been subjected to a trial and conviction by court-martial for his breach of military law or discipline. In such instances the act committed is an offense against the two jurisdictions and may legally subject the offender to be tried and punished under both.* This doctrine of double amenability rests, of course, upon the assumption, 1st, that the offense, as Wharton† says, "is one capable of being broken into sections, or is in one sense aimed at one sovereign, and in another sense at another sovereign, so that each sovereign may independently prosecute for the ingredient or phase by which such sovereign is distinctively offended"; and 2d, that each tribunal shall confine its investigation and limit its punishment to that portion, phase or aspect of the offense which is obnoxious to itself. In other words, if trial by court-martial is no bar to a subsequent trial for the same act by a criminal court, the reason, as above stated by Hare, must be found in the fact that the jurisdiction of the military court is rigidly limited to the military aspect of the case. The civil qualifications of the act, the crime against society which it involves, must (at the military trial) be left entirely out of view. And the prisoner having expiated his military offense pursuant to the judgment of the military court, may then be turned over to the civil authorities to be dealt with according to the nature and degree of his crime against the civil state. This is manifestly the procedure contemplated by the 59th Article of War, which requires commanding officers, except in time of war, upon application duly made, to use their utmost endeavor to deliver up military persons accused of offenses punishable by the laws of the land, and to aid the officers of justice in apprehending and bringing them to trial.

The rule is equally obvious where the civil jurisdiction first attaches and the civil trial precedes that of court-martial, the military aspects of an offense not being cognizable by a civil tribunal. The jurisdiction of military courts over offenses purely military, as desertion, or over the purely military aspect of a crime when committed by a soldier, is necessarily exclusive. This has

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* Digest Op. J. A. G., 215.

The same reasoning applies to contempts, the court seeking to punish only that aspect or relation of the act which is an affront to its own dignity, leaving to a jury to determine whether a misdemeanor (or other crime) has been committed.

† Cr. Pl. & Pr. 9th Ed. 442.

been recognized for centuries. In the time of James II., there being no statutory provision for the punishment of military offenses committed in time of peace, the king, observes Macaulay.* "had one plain choice before him; to let his army dissolve itself or to induce the judges to pronounce that the law was what every barrister in the Temple knew it was not. * * * It was indeed necessary to go very low down in the legal profession before men could be found willing to render such services." A number of incorruptible judges were dismissed from office and their places filled by shameless parasites who "were beneath even the miserable dignity of corruption." "When these changes had been made" continues the historian, "several deserters were brought to trial. They were convicted in the face of the letter and of the spirit of the law. Some received sentence of death at the bar of the King's Bench and some at the Old Bailey. They were hanged in sight of the regiments to which they belonged." This audacious proceeding by which King James sought to make military offenses justiciable by civil courts was perhaps not the least of the many tyrannical acts which hastened the downfall of that headstrong prince.

We find ample illustration, also, of the doctrine in our own brief experience. In a case of homicide which arose in the army in 1842, the Hon. John C. Spencer, Secretary of War, submitted to the Attorney General the question, whether a plea in bar, of having been tried in the Supreme Court of Florida on the charge of manslaughter, sustained by the same evidence and involving the same facts as must be relied on to maintain the charge before the court-martial, is a good defense.

In reply to this question, Attorney General Legare said: "I am quite clear the plea in bar of *autrefois acquit* is not good, the *offense*, which is the *subject matter* of the *second trial*, being *altogether different from manslaughter*, viz., unofficer-like and ungentleman-like conduct, to be punished according to the 83d Article of War."†

Now, the 83rd Article of War (now designated as the 61st) authorized no punishment for the civil crime. It simply declared that "any commissioned officer convicted before a general court-martial, of conduct unbecoming an officer and gentleman, shall be dismissed the service."‡

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* History of England, Ch. VIII.

† III. Op. Atty. Gen., 749.

‡ See Dig. Op. J. N. G. 41 para 19; also Whart. Cr. Pl. and Pr. 918.

The function of the military court under this Article was simply to rid the army of an unworthy member. The civil relations of his crime had already been considered and disposed of by a competent tribunal, and could not be again inquired into.

Mr. Attorney General Cushing also gave this subject of the double amenability of the soldier most careful consideration, and in an exhaustive review of the whole matter said:

"The British Articles (of War) while they expressly recognize the liability of the officer or soldier to be tried by the military authorities, after having been tried for the same act by the civil magistrate, and whether he be acquitted or convicted, proceed to limit the punishment to which in that case he may be subsequently sentenced, and say *that it shall stop at cashiering.*" In other words the soldier may be tried for the military relations or qualifications of his crime *after* having been tried by the civil court for its civil relations, but in awarding punishment under the military code, the military court must confine itself to a purely military penalty, viz., *cashiering*. This is in exact accord with the "reason" above enunciated by Hare that "each jurisdiction takes cognizance of so much of the injury only as is peculiar to itself." "No such limitation," further observes Mr. Cushing, "occurs in the correspondent provision of our Articles."* But since Mr. Cushing's day the justice of this limitation has been recognized and adopted by the American authorities and may now be regarded as a fixed principle of our unwritten law.

A case in point is referred to in the Digest of Opinions of the Judge-Advocate-General of the Army (p. 450). A soldier having been brought to trial before a civil court for the homicide of another soldier and inadequately sentenced, was subsequently tried by a general court-martial for the military offense involved in his act. It was held in this case by the Judge-Advocate-General that the court-martial could only properly impose upon him a penalty proportioned to the injury done to the good order and discipline of the service, and should not by an excessive punishment attempt to compensate for the over-lenient judgment of the civil court.

This question of amenability to separate jurisdictions of the same sovereign power is, of course, entirely distinct from that of accountability to two independent sovereignties and must not be confounded with it. It is not forgotten that the Government of

* VI. Op., Atty. Gen., 418.

the United States and that of the several States are each within their respective spheres, separate and distinct sovereign powers * and that each has the right to exercise penal discipline over every person abiding within its jurisdiction. In the absence of specific statutory provision † a foreign acquittal or conviction may not be pleaded in bar. But likewise in cases of this character the double aspect of the offense is kept in view and where it is found to be single and indivisible and is taken cognizance of in its entirety by the courts of one sovereign power the weight of opinion seems to be that the court thus seizing jurisdiction absorbs the offense and further prosecution by the other sovereign is thereby barred.‡

The function of the court-martial in time of peace appears to be analogous to that of the municipal courts, simply to maintain the good order and discipline of the military community, leaving to the State authorities the enforcement of the general laws of the land. This distinction is ably defined in an interesting case in Alabama § in which Chief Justice Collier delivering the opinion of the court, said: "The object of the power conferred by the charter and the purpose of the ordinance itself was not to punish for an offense against the criminal justice of the county, but to provide a mere police regulation for the enforcement of good order and quiet within the limits of the corporation. So far as an offense has been committed against the public peace and morals, the corporate authorities have no power to inflict punishment. * * * The offense against the corporation and the State are distinguishable and wholly disconnected. ‖

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* State vs. Rankin, 4 Cold.

† By the New York Penal Code, 1882, Section 679, a foreign conviction or acquittal is a bar to a trial in New York for the same act or omission.

‡ Thus says Wharton: "Where a particular offense as an entirety is cognizable by two sovereigns, the first sovereign that takes possession of the defendant, and undertakes the prosecution of the offense, absorbs the case as a general rule, which action if *bona fide* and complete, is a bar to the action of the other sovereign.

§ Mayor of Mobile, etc., vs. Allaire, 14 Ala. 400.

‖ This view appears now to be sustained by the weight of authority, although the difficulty of recognizing the different aspects of an offense has involved the cases in considerable confusion. In Wragg vs. Penn Township, 94 Ills. 23, Dickey, J., said: "The decisions on this subject by the courts of the several states are apparently in hopeless conflict with each other." And he quotes Dillon on municipal corporations as follows: "Hence the same act comes to be forbidden by general statute and by the ordinance of a municipal corporation, each providing a separate and different punishment. But can the same act be twice punished, once under the ordinance and

These conclusions are in entire harmony with the righteous maxim of the old Roman law *ne bis in idem*, which corresponds to the familiar constitutional principle of our own law that no man shall be twice put in jeopardy for the same offense. This maxim was based, indeed, upon the Roman theory of the union of all nations under one imperial head, but the theory is not wholly inapplicable, we may believe, to our own times and country, the War of Secession having demonstrated the national and indissoluble character of our union of States.*

Returning now to the doctrine as laid down by Hare let us inquire if the "reason" upon which his conclusion proceeds actually obtains. Does a court-martial in trying a soldier under our present Articles of War, really take cognizance of "so much only of the injury as is peculiar to itself"? Possibly Congress has not the constitutional power, as the learned author contends, to confer criminal jurisdiction on military courts in time of peace, the military being held at all times in strict subordination to the civil authority, except, perhaps, during war, insurrection or rebellion, when military supremacy, as Blackstone says, must be briefly endured, as a "temporary excrescence born out of the distemper of the State." This principle was certainly cherished and asserted in strong terms by the fathers who achieved the great Revolution, and the Continental Congress resolved "that all military officers and soldiers in the service of the United States are, and of right ought to be, amenable to the laws of the State in which

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* In Marshall v. the State, 6 Neb., 120, it is said: "the courts would undoubtedly consider favorably to the defendant the fact, if it existed, that he had been punished for the same act in a foreign country." And it is argued by Bar (§ 143, page 560, Whart. Cr. Pl. and Pr., 442, note), that "a foreign acquittal is to be regarded as a *lex generalis* that the case was not penal." In the leading case of Fox v. the State of Ohio (5 How. 412), Mr. Justice Daniel, delivering the opinion of the court, said: "It is almost certain that in the benignant spirit in which the institutions both of the State and Federal systems are administered an offender who should have suffered the penalties denounced by the one would not be subjected a second time to punishment by the other for acts essentially the same." And in the same case Mr. Justice McLean (dissenting) declared "nothing can be more repugnant or contradictory than two punishments for the same act. It would be a mockery of justice and a reproach to civilization It would bring our system of government into merited contempt."

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they reside in common with other citizens."* The same doctrine is adhered to in England and was rigorously maintained in the parliamentary debate on the trial of John Smith at Demerara. But as the days of tyranny and military oppression recede farther and farther into the past there appears to be a certain relaxation of these jealous limitations, and we may even remark a positive growth in our apparently inflexible Constitution, which, it has been said, though confined by its character as a written instrument to certain bounds, was yet intended "to live and take effect in all succeeding ages." Although we have to-day the same government that went into operation a century ago, it has undergone the development incident to maturity, and it has a capacity for adaptation to all the varying phases and crises of human affairs.† It is not necessary, however, to dwell here upon the doubts which may be entertained in this regard. We have the eminent authority of Chancellor Kent for the belief that Congress has the power referred to, and this view appears to have been confirmed by the Supreme Court of the United States. "It is not a question susceptible of doubt," observes Chancellor Kent, "that Congress may, under the Constitution, confer upon courts-martial in the army and navy the trial and punishment of *crimes, capital and otherwise*, for they are authorized to make rules for the government and regulation of the land and naval forces, and cases arising in the land and naval forces are excepted from the provision that no person shall be held to answer for a capital or otherwise infamous crime unless on a presentment or indictment of a grand jury."‡

In Coleman vs. Tennessee § (a case, however, which related to a time of war) Mr. Justice Field, who delivered the opinion of the court, said: "We do not mean to intimate that it was not within the competency of Congress to confer exclusive jurisdiction upon military courts over offenses committed by persons in the military service. As Congress is expressly authorized by the Constitution 'to raise and support armies' and 'to make rules for the government and regulation of the land and naval forces,' its control over the whole subject of the formation, organization and government of the national armies, *including the punishment of*

* 2 Journals, 572. See also Ibid 68, and 3 Journal, 77.

† 1. Hare Am. Const. Law 10.

‡ 1. Kent's Comm., 341, note.

§ 1. 7 Otto., 513.

offenses committed by persons in the military service, would seem to be plenary." Nor does the exercise of this power appear necessarily to contravene the principle of civil supremacy contended for by the patriots of '76. As already suggested, it is made the duty of the immediate commanders and superior officers under the 59th Article of War, to deliver the accused person over to the civil authorities, upon application duly made; but if such application be not made in due season it has been held the clear right and duty of the military authorities to proceed and bring him to trial under their own jurisdiction.* If upon this trial the military court is authorized to consider and does, in fact, consider both the civil and criminal aspects of the offense and if it punishes it in its entirety, does it not necessarily absorb the case and exhaust the jurisdiction, and is not its action clearly a bar to further trial for the same act in any other forum? Now, it is unnecessary to recite the Articles of War in this relation. Every officer who has served on court-martial knows that military prisoners are being daily tried for crimes and not infrequently sentenced to the penitentiary for the civil relations or qualifications of their offenses. The very fact that the statutes of the State, district or territory in which the crime is committed, must be consulted to ascertain if the crime in its *local* aspect is a felony, indicates that the *civil* and *local aspect* of the offense is that which the military court is authorized to punish.

This finds forcible illustration in a case of larceny when committed by a person in the military service. Under the code of punishments prescribed by the President† we find the punishment in all cases of larceny, irrespective of the value of the property stolen to be dishonorable discharge with forfeiture of all pay and allowances. This is clearly for the military aspect of the case. But when we come to determine the period of confinement to be imposed, the value of the goods must be looked to; nay, more, the local statute must be consulted to ascertain if it be a felony. This is for the civil relations of the act, for the crime against society.‡

* *Ex parte* Mason, 105, U. S., 696. In this case the court (Mr. Chief Justice Waite delivering the opinion) said: "The choice of the tribunal by which he is to be tried has not been given to the offender. He has offended against both the civil and the military law. As the proper steps were not taken to have him proceeded against by the civil authorities it was the clear duty of the military to bring him to trial under that jurisdiction."

† G. O., 21, A. G. O., 1891.

‡ Prior to the enactment of the 97th Article of War which first appeared as sections

As observed by the court in the Mason case above cited, "the act done is a civil crime and the trial is for that act." The only condition necessary to give the court-martial jurisdiction is that the accused shall be a person in the military service. Nor is it required that his offense shall in all cases constitute conduct to the prejudice of good order and military discipline.* We also find this jurisdiction recognized by the text writers on military law, and in our Army Regulations. Winthrop says, "under Article 62, courts-martial have duly and not unfrequently taken cognizance of civil crimes when committed by soldiers (and within the above description†)," *i. e.*, when constituting conduct prejudicial, or conduct unbecoming an officer and a gentleman.

Paragraph 1023, Army Regulations, declares that, "Under the 97th Article of War general courts-martial may sentence soldiers, for certain offenses not strictly military, to confinement in a penitentiary."

If these offenses are not "strictly military" they must be partly civil. If under the prohibition of the 97th Article of War

one and four of an Act approved 16th July, 1862, prisoners in the army and navy convicted of purely military offenses were subject to confinement in the penitentiary. The case of Dynes vs. Hoover, familiar to military readers, arose from the incarceration of a seaman in the penitentiary for "attempting to desert." It was to prevent this practice and to allow such punishment only where the offense proved was, in addition to its military character, also a felony, that the prohibition now embodied in Article 97 was passed. This legislation was had several months prior to the enactment of Article 58 (which appeared as section 30 of an act for enrolling and calling out the National forces, approved March 3, 1863), and was of course intended to apply to the civil aspect of crimes tried under the 62d Article. It was doubtless one of the many effective war measures resorted to during the Rebellion and designed to expedite the punishment of grave offenses committed in the army *during war* when soldiers accused of crime are not required by the 59th Article to be surrendered to the civil authorities. But it was not so limited in terms, and the practice under it has continued in full vigor to the present day.

* The 60th Article of War provides for the punishment of certain crimes regardless of their effect on military discipline. Attorney General Cushing in his opinion on the case of Assistant Surgeon Steiner (VI. Opins. 418), says: "The instances will be very rare, in which, as to ordinary acts of violence committed within the ranks of the army itself the intervention of the civil magistrate will be possible by the letter or spirit of the act of Congress. Practically, therefore, it leaves to the military authorities complete and exclusive jurisdiction of all acts of ordinary violence committed within the interior of the army." In a preceding paragraph of the same opinion he makes a distinction as to felonies, as they are offenses in which society in general is concerned. "The case of murder or other felony," he observes, "will admit of being distinguished in this respect from ordinary acts of violence whether committed without or within the army."

† 1. Win. Mil. Law, p. 961.

they are punishable by confinement in a penitentiary, they are, at least in their local aspect, felonies.

Those who contend that the civil jurisdiction remains unimpaired by the action of a court-martial in these instances appear to find comfort in the case of the United States v. Cashiel*, the syllabus of which declares that "an acquittal before a court-martial cannot be pleaded in defense of an indictment in a court of law; even though the offense charged in either case be substantially the same." In this case the defendant, after having been tried by a military court under the 57th (now 46th) Article of War for "conveying intelligence to the enemy," was again put upon his defense in the United States District Court at Baltimore, upon the same statement of facts, for "giving aid and comfort to the then existing rebellion," in violation of the second section of the Act of July 17, 1862.† In this case the court says: "Is the said charge the *same offense* (within the meaning of the fifth amendment to the Constitution of the United States) for which the traverser now stands indicted? * * * What is meant by the word *offense* as used in the fifth amendment to the Constitution? This is settled by the Supreme Court in Moore vs. The People of the State of Illinois, reported in 14 Howard, 17, where Justice Grier says, in delivering the opinion of the court, 'An offense in its legal signification means the transgression of a law.' In this case we have *two laws*—the Articles of War as contained in the act of 1806 and the law of 1862 which I have before cited—and their provisions are different.

"The 57th Article of War punishes the holding of any *correspondence* or the *giving of any intelligence* to the enemy. For in a time of war (when alone this article operates) it might be prejudicial to the discipline and good order of the army that any correspondence should be held by any of its members with the enemy, although the intelligence given might be in no manner in furtherance of that enemy's views and designs. Whereas, no conviction could be had under the act of 1862, unless the intelligence given was of such a character as to give aid and comfort to those engaged in the insurrection. It might very well be, then, that facts which would warrant a conviction under the 57th Article of War could produce no such result in an indictment under the second section of the act of 1862. And many facts would

* 1. Hughes, 552.

† 12 U. S. Stat. at large, 590.

warrant a conviction under the act of 1862 which are not punishable under the 57th Article of War. These are laws to be administered by different tribunals, and they create distinct offenses." From these observations it may be seen that the double aspect of the case was here again recognized, and the concluding statement of the syllabus is therefore inaccurate and misleading.* Otherwise it would be competent for the Government by two separate statutes to denounce "substantially the same" crime, and thus multiply offenses indefinitely. By the *same offense* is of course not signified the same *eo nomine*,† but the Government cannot avoid the bar, says Cooley,‡ "by varying the form of the charge in a new accusation." Thus under the 51st Article of War a soldier may be tried by court-martial for persuading "another soldier to desert." Would the verdict of such court be no bar to his subsequent trial under section 5455 Revised Statutes for "enticing" his comrade to desert? Both statutes emanate from the same sovereign power; both are designed for the same purpose—to protect and maintain the integrity of the military service.

A valuable dictum, in this relation, is found in the case of Wilkes vs. Dinsman.§ An action for trespass for assault and battery having been brought by a marine against his superior officer, the defendant sought to introduce the record of a court-martial by which he had been acquitted of a criminal charge on the same statement of facts. The case was brought to the Supreme Court by writ of error.

Referring to this point, Mr. Justice Woodbury, who delivered the opinion of the court, said: "We think that such proceedings were not conclusive on the plaintiff here, though a *bar to subsequent indictments in courts of common law* for the same offense,

* In considering opinions handed down during the war it is well to bear in mind the peril to which the country was exposed which, as Hare says, "naturally inclined the courts to strengthen the government and uphold every law passed in good faith for the suppression of the insurrection." The judicial no less than the legislative branch was tempted by the painful exigencies of the times to go to the very verge of the Constitution, if not beyond. As observed by Mr. Justice Davis in *ex parte* Milligan, "the temper of the times did not allow that calmness in deliberation and discussion so necessary to a correct conclusion of a purely judicial question. Then considerations of safety were mingled with the exercise of power, and feelings and interests prevailed which are happily terminated."

† State vs. Thornton, 37 Mo. 360.

‡ Cooley Const. Lim., 398-401, and authorities there cited.

§ 7. Howard, 123.

the parties then being the same likewise and the tribunal acquitting competent to examine and acquit."

That it is contrary to the genius of our institutions for a court-martial, which is merely an instrumentality of the executive power, to encroach upon functions jealously reserved to the judiciary, has been repeatedly insisted upon by statesmen and jurists on every appropriate occasion.* But however tenaciously our courts may cling to this safe principle, it is evident that our legislation and practice in the instance here considered do not respect it. Instead of contenting ourselves with dishonorably discharging the convict with a term of confinement in the guard-house or at Leavenworth commensurate to the military aspect of his offense, we set about studying the criminal codes of the land with a view to punishing the local and civil aspect of the crime. This practice doubtless may often possess the advantages of public convenience and economy; it may also frequently be desirable in the interests of substantial justice and penal discipline. For if not punished by the military court for his crime against society the military convict would probably never be punished for it at all. How many "ex-convicts" are arrested as they emerge from the guard-house or military prison and taken back to the vicinage of their crime to stand trial for its civil relations?

If our military courts are to remain in time of peace what they were anciently designed to be—simply courts of honor for the maintenance of the high integrity and discipline of the army, refraining from interference with the soldier's responsibilities as a citizen and regarding only the prejudicial quality of his conduct in its relation to the military state, they should not be called upon to administer the criminal justice of the country, and should have no concern as to the statutory distinctions relating to misdemeanors, felonies and infamous punishments in the penitentiary.

* In the case of Kilbourne v. Thompson, 13 Otto, 168, Mr. Justice Miller, delivering the opinion, said: "It is believed to be one of the chief merits of the American system of written constitutional law, that all the powers intrusted to governments, whether State or national, are divided into three grand departments of the executive, the legislative and the judicial. That the functions appropriate to each of these branches of government shall be vested in a separate body of public servants, and that the perfection of the system requires that the lines which separate and divide these departments shall be broadly and clearly defined. It is also essential to the successful working of this system, that the persons entrusted with power in any one of these branches shall not be permitted to encroach upon the powers confided to the others, but that each shall by the law of its creation be limited to the exercise of the powers appropriate to its own department and no other.

The old mutiny act declared that nothing in it should "be construed to exempt any officer or soldier whatsoever from being proceeded against by due course of law." This is the spirit of our own system and it should be incorporated in our military code. But under our present practice, if a soldier has been once in jeopardy of the penitentiary at the hands of a duly constituted and competent tribunal, it is difficult to see how, upon a second arraignment for the same clearly defined common law offense under some other statute or in some other jurisdiction under the paramount authority of the American flag, he can be deprived of the protection of the just old maxim, *Ne bis in idem.*

SOME THOUGHTS ON METHODS OF ATTACK.

By Brig.-General M. D. HARDIN, U. S. A. (Retired.)

THE method of attack being now so much discussed, and critics having finally agreed that the Franco-German War did not teach everything that is best to be done in war, the writer ventures to present a few thoughts which have occurred to him as the result of experience in the field during 1861–65.

The general character of war has changed little since 1865—the principles of strategy and logistics are immutable.

The Franco-German War of 1870 teaches us little in logistics. General Sheridan frequently spoke of the ease with which he could have cut off the supplies from the German army operating before Paris.

Our late war furnishes numerous examples in logistics worthy of study; Sherman's army before Atlanta and Lee's in Western Maryland and Pennsylvania, exhibited wonderful feats of skill in supplying an army far from its base.

The principal change which has to be provided for arises from the use of the long-range rapid-fire weapons.

Let us first consider the organization of companies and regiments of infantry.

The main objection to the continental organizations is, that both companies and regiments are too large. Few brigades, after the first year of our late war, contained as many private soldiers as are now found in a continental regiment on a war footing. It will

be admitted by all officers of experience in the field that our brigades were not then over-officered. The three battalion organization for infantry is the proper one, provided the companies are not too large and the regiments are sufficiently officered. The three battalion regiments require, relatively to number of private soldiers, a greater number of officers and non-commissioned officers than do our present regiments. These officers and non-commissioned officers give life, spirit, discipline and *esprit de corps* to the regiment. The continental plan of increasing the regiment to an unwieldy extent by filling up the ranks in time of war, is the worst possible method of increasing an army for fighting purposes. The writer has no faith in the so-called independence of the individual soldier. Only very old or "seasoned" soldiers can be trusted out of sight of their officers. All others will waste their ammunition in order to be relieved or to straggle (General Lee's army and the Army of the Potomac, suffered dreadfully from this fault during the first year and a half of the war, as did also the Germans in the War of 1870); or, at least, they will waste their ammunition by firing without aiming, which with the present weapon is a pure waste of ammunition; or will cling to obstacles instead of advancing. In short, ordinary men are not heroic except on occasion, and then, as a rule, only in the presence of their officers, who can reward them. Veterans can no doubt be trusted with a more limited supply of officers.

With the present infantry weapon, accuracy of fire is of inestimably greater value than volume of fire. All troops, but especially veterans, are encouraged when their opponent's fire is inaccurate.

The following occurrence came under the writer's observation: A thin skirmish line of Confederates concealed by a "worm" fence, killed and wounded over two hundred members of one of our new regiments in not over twenty minutes, probably without any loss to themselves; whilst our regiment, standing up, fired off all its ammunition into the air at an enemy, visible, but entirely beyond range. The writer commanded the brigade, division and corps skirmish line quite frequently, and in his command, during the greater part of Grant's campaign from the Rapidan to Cold Harbor, was a rifle regiment (1st Pennsylvania Rifles) armed with breech loaders,—the oldest regiment so armed in the army. He had numerous opportunities during 3 years, of seeing what a skirmish line of seasoned troops could accomplish both in attack and defense. Such a skirmish line could easily defeat a line of battle

of new troops, however well disciplined, provided the new troops were not protected by rifle-pits—well disciplined new troops are almost equal to old or seasoned troops behind a parapet.

Skirmishers, at the usual distance apart (three to five yards), have such facility for protecting themselves by taking advantage of obstacles, many of which are not visible a few yards distant, that even in open ground, they cannot usually be dislodged by a line of battle. Such a line of skirmishers always delivers an aimed fire, while a moving line of battle practically never does. It is doubtful if a line of battle, not intrenched, ever delivered an aimed fire. Is the present infantry rifle, when not aimed, any more effective than was the old muzzle-loader?

As soon as a skirmish line is filled up to that point that the men in rear are liable to hit those more advanced, the line has ceased to have the special advantages of a skirmish line and then becomes a single line of battle, and should have all its officers and non-commissioned officers on the line in position for a rush.

One skirmish line following another is a weak formation, except when the rear line is sent to reinforce the advanced line, on account of losses. This method of reinforcing the skirmish line, for a rush, does not give the moral support to a skirmish line that a solid body of men does. There may be an exception to this in very wooded country. Both sides should in future, as did both sides in the last year of our war, cover their fronts and flanks with skirmishers, as close together as the nature of the country will admit, without too great losses.

It had best be conceded that a line of battle composed of good troops armed with modern rifles, if protected by any kind of rifle-pits, cannot be carried in broad daylight over perfectly open, unobstructed ground. All attempts of this kind failed in our war (the defenders armed only with muzzle-loaders), except when there was a great diverting attack, or other advantage, in favor of the assaulting column. For instance, Meade's assault at Fredericksburg carried part of the Confederate line near their right, the principal Union attack being made on their left. Meade had some slight advantage of timber and rough ground. Still, it was one of the most brilliant assaults of the war, with terrible losses (40 per cent.), failing finally for want of support. Hancock's assault on Lee's lines at Spottsylvania, one of the most successful of the war, was aided by a fog or mist and the nature of the ground, and was also a partial surprise to the enemy.

Still, only perfectly seasoned troops could have succeeded or held their ground. The Bloody Angle will be remembered long after the names of those who created it are forgotten.

The assault of Thomas' army at Chattanooga comes the nearest of any to the idea of a successful charge over open ground. The enemy in this case was partially surprised in that he did not think Thomas' troops would dare to charge over open ground. At the same time a great battle was going on, the principal Union attack being on the enemy's right. It should be remembered that in these three cases the assaults were made by seasoned troops and only muzzle-loaders were opposed to them. The writer witnessed from Round Top, Pickett's grand assault at Gettysburg, and many other unsuccessful ones on both sides.

It would appear, therefore, that great attention should be given to the locality of the attack in all its details, in order to have some of these in favor of the assaulting column. Advantage should be taken of rain, mist, fog, early morning, dusk of evening, night or darkness (remember Kars taken at night, Plevna not taken in daylight). The Confederates particularly favored early dawn and twilight, a mist very frequently covered low ground in the South at those hours; and five o'clock in the morning courage is peculiar to seasoned troops. As to commencing the attack with artillery at great distances from the defenders, only very raw troops would be shaken by such fire. No disciplined troops would regard it. For the foregoing reasons, most of the discussion of premeditated attacks, over open ground, against an enemy having the same character of troops as the attacking party, would seem to be unnecessary. It is immensely more important now than formerly to conceal from the defense the main point of attack.

The defenders should be deceived by many false attacks, and not learn till the very latest moment where the main attack is to be delivered. Artillery must be with each part of the attack and must more than ever be in front at the very first line of the assault, behind the skirmishers. But no concentrated fire of batteries, however numerous and well served, should drive good infantry off of a chosen position. Only those who have protected themselves from artillery fire can appreciate how small a rifle-pit, or gentle a slope, will protect a line of battle of infantry from great injury by artillery. Artillery fire close at hand makes great impression upon infantry, but distant fire has very little effect,

even upon new troops. The writer frequently saw the immense advantage that seasoned troops had over well disciplined new troops, as exhibited in action, both sides armed with muzzle-loaders; the advantages should be still greater for seasoned troops, both sides being armed with long-range magazine rifles. He is therefore no advocate of short term soldiers.

There being now no veteran armies in Europe, the army that shows the most enthusiasm will probably (the commanders being equal) be successful. The German generals in the Franco-German War all exhibited an earnest desire to fight and to support each other on all occasions, without waiting for orders, and sought opportunities for helping each other. This characteristic, which the Confederate generals exhibited very conspicuously, was seldom shown on the Union side. This spirit would seem to be more necessary now, in these days of large raw armies, than formerly, and should be encouraged accordingly. Old soldiers who have seen much fighting, when on skirmish resemble sportsmen in pursuit of game, and are quite as skillful in concealing themselves, whilst as keen at detecting their game (the enemy). In a charge they are as indifferent to danger as the accomplished duellist. This habit or state of mind, can undoubtedly be cultivated by a long course of discipline, or by making an occupation of soldiering. The sense of military duty grows with time, so that the old soldier in peace, like the seasoned soldier in war, acquires the feeling that he is a part of the State, and goes into action from a sense of duty, with the utmost *sang-froid*. To get the full value out of the magazine long-range rifle, time as well as drill are essential to the soldier. As you improve your weapon you should improve the user of it. One hundred men perfect masters of their complicated rifle and of themselves, ought to be a match for two hundred men who are not cool, who waste their ammunition by firing too fast and by failing to take aim.

The following incident is given to show the difference between seasoned troops and well disciplined new troops. While before Spottsylvania, a small Confederate division (about 2200 men) passed to the right and rear of one of our new divisions (about 7000 men) and in about two hours, killed and wounded over two thousand men, with a loss to themselves of about two hundred and fifty. In the meantime they accomplished what they had set out to do—learn where our communications were.

From the history of our country, we have learned the weak-

ness of militia as compared with regulars and volunteers. With veterans, but more particularly with new troops, it is most important to get the column of attack (no respectable troops should allow a "single line of attack" to carry their position, however badly it may be located) near the point of attack, with small losses; this can now be done only by taking advantage of locality, fog, rain or other obscure weather, or by some ruse. No troops can now advance over six to eight hundred yards of open ground without possessing some great advantage over the opposing line of defense.

At Bethesda Church five brigades of the best Confederate infantry assaulted a portion of our line of battle, which was extended by a skirmish line to make connection with the division on our right. This skirmish line was formed by the rifle regiment armed with breech-loaders. The Confederate column, formed with brigade front, struck our line of battle where it was protected by slight rifle-pits, and on our right, where was only the skirmish line. Our men were all seasoned soldiers. The enemy's assault was so determined, and came so close to the rifle-pits, that we had to reinforce the line at this point during the assault. The Confederate column came to within thirty yards of the rifle-pits before it was finally checked; it did not get that close to the skirmish line. At the time that each of the succeeding brigades reinforced the most advanced Confederate brigade, the fire of this skirmish line seemed to be absolutely continuous. After the action was over, the major commanding this skirmish line was asked if he had not concentrated his men on his left, he replied that he had not, that the men were at skirmish distance apart—more than a yard. Of course it should be remembered that these were absolutely perfect skirmishers, perfectly cool, and complete masters of their deadly weapons. A peculiarity of this rifle regiment was, that, although daily on skirmish duty, it never was out of ammunition. The men would come to the ordnance officer without orders to have their cartridge-boxes filled, and before going on skirmish always wanted their pockets also full of cartridges.

Earlier in this day our skirmishers, armed with muzzle-loaders, were directed to carry the edge of a wood on the farther side of an old cornfield, about three hundred yards distant; notwithstanding the utmost efforts of the officers, they could not succeed. A column was then formed and directed to carry the position.

Knowing that our losses would be very heavy in this formation, the rifle regiment was directed to deploy as skirmishers on our front, and try to carry the enemy's position. It deployed at one edge of the cornfield, then running out into the open field, the men fired four or five rounds as rapidly as possible; the enemy began at once to reply, before his fire was at its height, our skirmishers fell flat behind the corn stalk hills (the corn stalks had been cut), firing occasionally. The enemy's fire slackening, our skirmishers rose, rushed toward the enemy, firing four or five rounds as before; as soon as the enemy's fire became brisk, they dropped. The enemy's fire slackening again, our skirmishers rose and ran, firing, and kept on into the wood. The enemy's line retired, resisting sharply, to their breastworks some distance in rear. The loss to our skirmishers was comparatively light. Their skill, energy and determined courage called forth the cheers of the supporting column. In all our skirmishing, even when the firing was most severe, the officers kept close up to the men. The commander of the whole skirmish line was always mounted and kept in sight of his line. He kept moving so as not to run needless risk.

When advancing under fire, commanding officers of companies, battalions, regiments and brigades, and at times, of divisions, must, more than formerly, expose themselves, keeping near the firing line. Critical moments will occur more frequently than in the past; and it is very important to take advantage of every kind of obstacle, many of which can only be seen when the commanding officer is fairly upon them. The gaining possession of a small house and surrounding fences sometimes enables one side to gain a favorable position.

The following illustration occurred at the battle of North Anna. The Confederate main attack was against our right in a wood. On their right they had posted some thirty-odd pieces of artillery, in open ground, which could concentrate their fire upon the open ground along the river and thus prevent our batteries from crossing the river and coming to the assistance of our infantry. The infantry fire in the woods was terrific—the Regular Division was barely holding its ground against Wilcox's Confederate division. Our division (3d of V. Corps), posted on the left of our line, could attack the enemy's artillery only by advancing a long distance over perfectly open ground. The enemy's artillery was supported, on its right, by a Confederate infantry force, partially intrenched

in a small frame house, outbuildings, gardens, etc. A column sent to carry this house and garden would have been destroyed by the enemy's artillery. The rifle regiment, above referred to, was directed to deploy at full distance as skirmishers, at the edge of the wood we occupied, to advance rapidly and to close in on the frame house and inclosures. Our skirmishers advanced with their accustomed skill and determination, and carried the frame house and garden, but at considerable loss. The enemy's artillery was compelled to withdraw and our artillery was enabled to cross the river. Our infantry on the right was about the same time reinforced, and thus the enemy's attack, which for a time threatened to cut off our isolated corps, completely failed. Our division and corps commanders, who were in their proper tactical positions near the river, could not see the little frame house and outbuildings, the possession of which possibly determined the fate of the battle. The skirmishers were sent out upon an order from the brigade commander who was on the firing-line.

The Germans in the Franco-German War of 1870 must have witnessed many such affairs as this, hence all their writers insist upon the necessity of having the rank and file intelligent, etc. Herein they are mistaken. The intelligence of the rank and file is of little or no effect in these cases. It is the intelligence and skill of the officers that is all important. If you leave the question of the manner, time, etc., of an attack to the soldiers or junior officers, you abandon the first principle of proper organization. Instead of a compact thoroughly organized force, which acts with a single impulse, controlled by a single head, you have an armed mob, such as the German attacking force only too frequently degenerated into. It looks to a casual observer of the Franco-German War as if a "special Providence" watched over the disorganized advancing line of Germans on many occasions. What would have become of such a line, had a yelling Confederate column made one of their fierce "returns" against it? The rank and file simply require to know how to use their weapons, to take advantage of small obstacles, to keep cool, to take aim, to save their ammunition and to exhibit personal courage, only showing such intelligence as ordinary men possess. The ranking commanding officer on the firing line must decide on the method of conducting the attack. The higher the rank of the commanding officer on that line, the better. The higher the rank of the officer giving such orders as above cited, the better; for, the more readily will junior

officers and soldiers obey. It makes no difference how good the rank and file may be, they like to see their officers in the fight with them; they then feel that if they do more than their simple duty they will be rewarded.

The following occurred in one of the best veteran regiments of the writer's command. This regiment had lost its commanding officer several times in successive engagements, finally a young major assumed command. In the first fight where he commanded "he showed the white feather,"—got behind a stump unnecessarily. The regiment was selected a few days afterward to reinforce and advance a skirmish line. It failed to show its usual spirit, and upon inquiring why so fine a veteran regiment had acted so half heartedly, the officers replied that their commanding officer was a coward and the men did not trust him. A plucky captain was put in command, and the regiment was itself again. It is generally conceded that the attack on the occasion of the mine explosion at Petersburg, Va., failed by reason of the wounding of the division commander, and the failure of the other generals to go into the mine to finish the attack.

On the other hand, in the case of the successful assault on Fort Fisher, N. C., the success was in great part due, firstly, to the perfectly reckless and most daring attack of the sailors and marines led by their officers, all of whom were either killed or wounded; this attack being regarded by the enemy as the main one; secondly, that the main attack was led and directed by the division commander (General Adelbert Ames) in person, and by the brigade commanders, who were all present in the work when the enemy made his supreme effort to drive back the assaulting column. It is not meant to detract from the courage and devotion of the soldier, but it must be admitted that every man is not a born leader, and someone must lead in battle.

At the end of the second year of our war, the soldiers as well as officers, of both sides, become convinced that attempts to carry lines of battle duly prepared, or those located in open country were usually failures. Thenceforth, each side was ever on the alert to surprise or get some advantage of the other, and thence arose two prominent and peculiar features of the war; a thick cloud of skirmishers covered the front and both flanks of each army, and a system of rifle-pits began immediately upon every halt.

When the hostile armies were near each other, each side made

most strenuous efforts to find a weak spot in the other's skirmish line; the great losses on the skirmish line on both sides were very remarkable.

The veteran troops had great misgiving of the new troops, in respect to their skirmishers. The latter were particularly careless or indifferent about making connections with the troops on their right and left, appearing to regard their immediate front as the only part of their line that it was essential to cover; whereas, the veteran troops, men as well as officers, were uneasy unless their flanks as well as their front were properly protected.

The Confederates from the beginning made skirmishing an important feature. It was not till the second year of the war that the Union side seemed to appreciate its importance. It is not meant that either side gained any great victories by means of these skirmish lines alone; but each side sought openings where he could push in a column of attack upon an unprepared part of his enemy's line. In the wooded country particularly, where most of our campaigning was done, this cloud of skirmishers was essential, both for the offensive and defensive. In such a country a skirmish line might overcome a line of battle. The main object of the rifle-pits, such as the soldiers on both sides constructed without orders at every halt, were to strengthen the ordinary single line of battle so that the men could feel safe against any sudden or unexpected assault.

Even in open country, a line of skirmishers covering front and flanks may be of great importance. A veteran officer of our army, who a few years since was observing the grand manœuvres of a continental army, tells a story somewhat as follows: He was with the headquarters of the defending force; this force held mostly open ground with here and there a small house with enclosure. On the right, about five hundred yards from the headquarters, was a small wood and other small screen, of such inconsiderable importance that no one on the defensive side regarded it as of sufficient consequence to put an observing force in it. The attack having begun, the general and staff of the defense were watching the front attack. Suddenly they heard a shout, and in a moment headquarters and staff were prisoners, taken by a considerable body of cavalry which had approached unobserved behind the small wood.

The writer does not believe that a line of skirmishers, however

much reinforced, can carry a line of battle composed of good troops armed with magazine rifles, except by surprise.

Columns of attack duly organized are as essential now as ever for successful assaults.

Good troops should now be able to hold a line of battle against any assault in open ground without the aid of rifle pits.

Assaults must be led by officers, and officers of higher rank than formerly, so as to take advantage promptly of changing circumstances. And, unless an assault follows immediately after a rapid and concentrated artillery fire, such fire will have little or no effect, but, on the contrary, may give the defense the information most important to him, namely, the main point of attack. Real veterans and seasoned soldiers being now practically unknown, enthusiasm, and generals who readily sustain each other, are essential to success.

THE PRINCIPLES AND PRACTICE OF SADDLING.*

By M. J. TREACY, Veterinarian 8th U. S. Cavalry.

I HAVE no hesitation whatever, in stating that the cause of sore backs is due to ignorance, which ignorance begets carelessness. Ignorance, inasmuch as it is impossible for any one who has not received instruction on this subject, to fit, with success, a saddle to a horse's back. Carelessness, in as far as it is difficult to make people believe that sore backs are due to defective saddling, and that wounds arising from this source, no matter how slight, will never get well until the cause of the irritation is removed. Ignorance, in not regarding the horse's back as being composed of living, sensitive structures; carelessness, in subjecting it often for hours together, to the continuous pressure of an unyielding saddle, and the weight of a tired soldier. Horses on the march, require their backs, blankets and saddlery to be looked after each day, if they are to be kept in serviceable condition. How many are there in our cavalry service who know anything of this subject?

Before entering into a consideration of the fitting of the saddle, we must thoroughly understand the parts of this necessary equipment, as well as the structure upon which it rests. I therefore shall attempt to give you a brief outline of the anatomical formation of the horse's back, for until this is clearly comprehended, the work of "fitting" must be entirely empirical and haphazard.

The back has for its foundation a chain of bones, known as the dorsal vertebræ, each bone being connected with two ribs, one on each side, 18 in number. Growing from the upper part, are prominent bony processes known as the superior spines. These spines are of the greatest practical importance to us. They are of different lengths, for we notice that they increase greatly in height from the 1st to the 5th, those forming "the summit of the withers"; from the 5th to the 13th they rapidly decrease in size, from the 13th to the 18th they are almost uniform. We likewise notice they do not all assume the same direction, for from the 1st to the 15th they incline backward, the 16th is upright, the

* A lecture delivered before the Fort Meade Lyceum.

17th and 18th incline forward; the 15th or 16th are said to be the keystone, or centre of motion. The ribs are 18 in number, divided into 8 true and 10 false, the 8 true ribs articulate with, or lean directly on, the sternum or breastbone, the 10 false ones having an indirect attachment with the preceding rib. The case, formed by the backbone, breastbone and ribs, for the protection and accommodation of the heart and lungs, is very narrow in front, and increases in width as we proceed backwards. The anterior ribs are consequently straight, whilst the posterior are greatly arched. The ribs which concern us most just now, from the 8th to the 18th, present, at their upper surfaces, a flat part of variable width, called the "arch"; the 8th and 9th for instance, have a flat upper surface of about two inches, the 10th to the 14th about four inches, the 15th to the 18th, five inches. As soon as these level places are formed, the ribs curve downwards, to form the sides of the chest. On the width of those level surfaces depends the width of the back, and on those should rest indirectly, the sideboards of the saddle. But if we depended on the flat upper surface of the 8th or 9th rib (the 8th is about two inches from the posterior edge of the scapula) to afford a sufficient bearing for the front of the saddle, it would not be enough, for as I have just shown, this surface is but two inches wide. Here we take advantage of those ribs being strong and firmly fixed to the sternum, or breastbone below, to impose weight upon their sides as well as arches.

The obliquity of the sideboards of the front of saddle is about 45 degrees; and not only the sides, but the upper surfaces of the ribs, participate in this weight-bearing function, which from their strength and support below, they are well calculated to endure.

Here is a saddle, composed of two bridges and two lateral supports; the anterior bridge, or arch, is known as the "pommel," the posterior as the "cantle"; the lateral supports are called the "sideboards, right and left"; these should end at the pommel, for reasons which I shall explain. Here are the quarter straps, front and rear, the quarter strap rings, the cinch straps; here the sideboards should follow the exact slope of the ribs; here it should rest flat on the upper surface of the posterior ribs, for their sides, receiving no support from below (unlike the front ribs), cannot bear any weight except on their upper surfaces; they are also shorter and weaker.

In the front ribs, the weight is transmitted from above and also from the sides; in the false ones from above, only. Viewed superiorly, the back is narrow in front, broad behind, in shape somewhat triangular.

The transverse measurement of the body through the 8th rib is about seven inches, through the 18th, sixteen inches. The scapula, or shoulderbone, is flat and triangular, apex inferior, and placed opposite the 1st rib; its posterior upper surface coming as far back as the 7th rib, it is placed against the body in that peculiar direction, obliquing downwards and forwards, particularly in the well-bred horse.

The body is slung betwixt the fore limbs. At every movement, the angle between the shoulder and arm opens and closes, and from the changes of its upper part follows: 1st. As the limb is extended forward, the anterior angle of the scapula is raised upward and backward, the posterior depressed forward and downward. 2d. The knee being fixed, and the foot being planted on the ground, the whole body passes over the limb, which, from inclining downwards and forwards when the foot first came in contact with the ground, gradually assumes the erect position. During the time the posterior angle of the scapula is ascending, and after the body has passed its centre of gravity and the limb assumes the position of downwards and backwards, the ascent of its posterior angle continues until the final propulsion is given to the body, when the whole of the back portion of this bone turns outwards, it, as it were, being pulled at this part from the ribs. This is the last act of propulsion.

I trust that I have said sufficient to show: 1st, that locomotion requires a great variety of movements of the shoulder bone, as it almost describes a semicircle each time the body passes over the forelimb; the centre of motion of this part being the shoulder. 2d, that any interference with its movements must affect propulsion, owing to the angles formed by the bones being unable to open and close to the necessary degree; that it must also affect materially the safety of the horse and rider, to say nothing of the pain due to the pressure of a saddle tightly girted, together with the weight of a rider, not forgetting the great waste of muscular force required to overcome these obstructions.

What more ridiculous and pitiable sight can be witnessed, than a troop horse with the saddle on its neck, tightly girted over his heart and lungs? Human athletes follow the Biblical

teaching of "girding their loins" during their exertions, leaving the chest free and unconfined for their powerful respiratory efforts. Do we not endeavor to constrict these necessary movements when we cinch forward?

Can we wonder at horses getting tired, with heavy-weights up, when they have an unyielding machine strapped on their shoulder-blades, binding them down each side in a vise, preventing the free movement of the forelimb? Can we wonder, whilst horses are thus maltreated, at stiffened limbs, incurable lameness, and injuries to men? and that on the march, daily reports of, "He can't keep up with the command," except by a sickly, bastard trot. Truly, horses' forelimbs are confined in a veritable straight-jacket under these conditions.

If these points are understood, and the front of our saddle be placed 2 inches from the posterior end of the shoulder-blade, one of the chief secrets of good saddling is mastered, as we know the forelimb to be an active propeller, as well as weight bearer to the body.

When a man sits upright in his saddle, the for elimbscarry 36-100 of his weight; when he leans forward, 57-100; when he leans backward, 12-100.

What does all this teach us?

1. Let nothing touch the shoulder-blades.

2. Carry no equipments on the front of the saddle.

3. Get the soldier to sit over the 14th dorsal vertebra, thereby saving the forelimbs from the unequal share of lameness, weight and concussion which now falls to them.

From the above statements, we are forced to the following conclusions: 1st. That the shoulder must in nowise be interfered with or pressed upon, or its function is very seriously impaired. It must have free and uncontrolled play. 2d. That the shape of the ribs prove where weight can best be supported. The large true rib, with its small upper surface, will stand pressure in a downward and outward direction, the false one, with its large upper surface, can bear weight in a downward direction only. 3d. The bony processes growing from the upper surface of the spine are unfit to bear weight. 4th. That any part of the back posterior to the ribs cannot bear weight; *a*, because there is no support below; *b*, the kidneys are immediately beneath the surface; *c*, the large propelling muscles of the body expand and contract here, causing a peculiar to and fro motion, which can be plainly

felt by the hand placed on the loins; these will force the saddle forwards and cause abrasions.

It is necessary to remember that no two horses' backs are alike any more than men's feet are, and if our saddles are made according to regulation, horses backs are not. Some horses are high in the withers, some low, some short and broad, others long and thin; some with backs like a billiard table, others razor shaped; some running high behind, others straight; some with a dip like a valley, others with an arch like a bow. All these forms are met with, and must be dealt with differently. But of all kinds of backs, let me warn you against that of the high-withered horse with hollows behind his shoulder blade. This back cannot be made to stand active service for obvious reasons.

With our knowledge of the theoretical structure of the back, we can see how important it is that saddles should fit. This we can never accomplish, unless we carefully and systematically set to work to study the conformation of the animal we are about to saddle, and obtain with exactitude the size of the different parts of the back upon which the saddle rests.

Each English cavalry regiment is furnished with a fitting-saddle, known as the "Wilkinson patent." It is simply a saddle hinged at the pommel and cantle, and graded so as to record the size and shape of the back. In fitting our saddle, it should be placed upon the bare back, the front of the sideboard should rest two inches below the shoulder blade. It must be wide enough to admit the blanket without pinching the sides of the withers, with at least two inches to spare at the top, and follow the exact contours of the ribs; at this part, remember, it must rest upon, and against them in front, as the saddle must get a hold here.

The sideboards must fit exactly the shape of the back; if too oval or convex, it will rock, if too concave, it only rests by its ends on the back, when these points will suffer. In front, the weight is transmitted downward and outwards, behind, from above only.

The man is now placed in the saddle and these points again examined, the fingers being passed under the front and rear of the sideboards to see that those parts are clear as well as the tops.

Sore backs may be divided into three classes:

1. Injuries to the summit of the spines.
2. Injuries to the sides of withers.

3. Injuries to the weight-bearing surface of the back proper.

The first class—injuries to the top of withers—are produced through the pommel touching those points, from being too wide, or the tree spreading. This must be remedied by a narrower saddle, or two blankets. There is no remedy for spreading.

The second class—injuries to side of withers—result from a narrow saddle, which rests vertically against those parts, instead of following their contour. The remedy is a wide tree or less blankets.

The third class—injuries to the back proper—chiefly occur over last rib, and are vulgarly known as "kidney sore." They occur on the nigh side from extra weight of carbine on off side.

Their causes are various—

1. When a saddle rests on the withers it is higher in front, the posterior ends of the sideboards are driven into the back by the weight of the man gravitating to the rear end of the saddle.

2. That vile seat known as the "barber chair seat," concentrates the man's weight behind, on the ends of the sideboards.

3. Sideboards being posterior to ribs, and lying on the enormous propelling muscles of the loins, these, by their powerful contractions, create wounds by friction against the rear ends of the side boards.

Loss of flesh, or "waste back," brings the weight nearer the bony column; starvation, or hard work, produces a loss of vitality of the skin, rendering it intolerant to pressure. This can only be remedied artificially by additional blankets.

Saddles suddenly removed from hot, sweat backs, cause rapid evaporation, producing tender skin, blisters, lumps and swellings. The blankets should always be circingled on backs for an hour or two after removing saddles.

If our horses were kept in muscular condition by gentle walk exercise two hours daily, instead of being mud fat, equipments could be fitted to them before starting into active service, which would continue a reasonable fit. A fat horse must get rid of his surplus adipose tissue before he is of any practical use for service. We can learn a great deal from our experienced mule packers, who never remove their aparajos from their charges' backs for an hour or two after getting into camp.

On the march, men should have at least twenty minutes to saddle their horses, and make their blankets and saddles a comfortable fit, as it is no easy matter to fit a full packed saddle

against time, particularly on windy days. It is scarcely fair or just to saddle against time, and then punish the men for saddle sores; give them plenty of time to saddle first.

One frequent source of misery and injury to our horses is a continual chafing of the cinch strap against the ribs. This strap is clumsy, thick and too long. The soldier, to get rid of it, rolls it frequently through the quarter strap ring and cinch ring, causing a protuberance, which injures the horse's ribs, and interferes with the man's knee grip.

As a substitute for the crupper and breastplate, I strongly recommend the circingle, over seat of saddle and around the abdomen back of cinch.

Every cavalryman should know what measures to adopt in the event of his horse suffering from saddle injuries, how to recognize the cause, and what expedients to adopt to prevent its continuance, for until the cause is removed the effect will continue.

FIELD MUSIC.

By Captain ABNER H. MERRILL, 1st U. S. Artillery.

THE present legal organization of our army calls for about 828 field musicians:—two for each troop of cavalry, battery of artillery, and company of infantry and engineers. For the cavalry they are designated as trumpeters; for the artillery, infantry and engineers, as musicians. For the three corps last named I believe the orders permit the use of either the trumpet or the drum and fife. It is deserving of remark that our organization authorizes for the entire army, besides the above-named field music, only one chief musician for each regiment of cavalry, one chief musician and two principal musicians for each regiment of artillery and infantry, and one small band for the Military Academy at West Point.

It seems requisite to consider very briefly the larger subject of bands, on account of the intimate correlation that should exist between the military bands of an army and its field music.

Our own is the only civilized nation of the world in which the organization of the army does not provide liberally for them. Every regiment of every army in Europe has its legally authorized band. In many cases separate battalions have them as well. In all these armies the field music serves as a nursery from which their bands are recruited; while they in turn foster and develop the field music, till its members become versatile artists of a quality that is entirely unknown to us.

A field musician of an English or French regiment uses a trumpet, fife or drum, with equal readiness and perfection, and often a cornet or trombone in addition. Regular schools, with the best musical professors, are provided for their instruction, as in the elaborate establishment commanded by a colonel at Kneller Hall in England.

Bands are considered a necessary part of European armies. Provision for them is not stinted. When the Royal Military Exhibition was held in London in 1890, seventy-four different English military bands, all from home stations, were listened to.

About forty musicians is deemed a minimum for efficiency in English military bands. In France those of the artillery and

infantry have 45 musicians, a bandmaster, and assistant; while in the cavalry they have only 37 musicians, a chief and assistant. German military bands have 46 musicians and a bandmaster, while in Austria, Italy and even Spain, they are still larger.

It may be said with perfectly truthful sarcasm that we have managed to get on, and even to do some tolerable fighting, without all this music. Still it is true that every good reason for maintaining cleanliness, training and discipline, in an army, is a valid argument in favor of bands. They promote the training and discipline which are absolutely requisite to efficiency in an army, to a degree far more than commensurate with their cost; and, beyond this, they may add something to that happiness which is the chief aim of human life.

European military writers assert that it is worth while to maintain them, and in a high state of excellence, solely on account of their potent influence in maintaining a kindly touch between the army and the masses of the people.

It may be said that the troops of our several States,—the National Guard,—have good military bands, and that these are sufficient for the purpose. But this opens up the whole subject of the relation that should exist between the National Guard and the Regular Army, and this vista is too wide to be entered upon at all in this paper.

The political or æsthetic reasons for maintaining bands in our army will not be mentioned, further than to suggest, that if the experience, far more extended than our own has been, of the strongly centralized monarchical governments of Europe, with their conscripted armies, has shown the advisability of the maintenance of military bands to preserve kindly relations between armies and the peoples they protect; it may be wise to consider what their influence would be here, in our young republic, where this touch with the people is the vital nerve on which the existence of the army depends.

The purpose of the field musician is first to furnish music, and second to do such other military duties as may be prescribed. His efficiency as a musician will depend on the instruments provided for his use, the correctness, thoroughness and extent of his training in the art of using them, and on his natural gifts and adaptability for the work.

His instruments are the trumpet, fife and drum. Of the fife and drum I will not speak, as we do not use them, except to say

that they are simpler instruments than the trumpet, and their use is more easily acquired.

The trumpet is the instrument generally used by our field musician. It is sometimes called a bugle but that is an error. Bugle is a much older word, and designates a shorter and thicker instrument. The trumpet, then, is a metallic tube, of circular cross-section, or bore, slightly expanded at the mouth end to facilitate its use, gradually increasing in size from its narrow neck throughout its length, and terminating in a quickly expanded bell-shaped end. The tube is usually coiled, in order to make it more convenient to carry. The tube is without any opening, valves or keys whatever, from end to end. It is made of brass of different proportions, of copper alone, of German silver, or of other metals. The material should be sufficiently yielding to respond to the impulse of sound waves, but not so soft or thin as to be too easily dented, or deprived of its proper form, by use.

The formulas for both material and shape of all wind instruments seem to be wholly empirical; but they may not be despised for this reason. Many branches of human endeavor are equally unsubmissive to science. The longer the tube of the trumpet the lower will be its key; that is to say, if the tube is longer, the same impulse from the lips will produce a lower tone. The art of the trumpeter consists in producing several different and distinct notes from the same unchanged tube. The process by which this is accomplished is not easily explained; but a higher or lower tone is produced by contraction or relaxation of the muscles of the lips and face. It is the trumpeter's art.

It is commonly believed that great power from the chest and lungs is required to produce the best effects; but on the contrary, the best players are invariably those who produce their effects with the least physical effort, and this is true of all wind instruments. It is an art for which the flexibility of youth is specially adapted, for which all persons would not be expected to have equal gifts, and one which no person could be expected to acquire without most careful instruction.

The trumpet may be made in such a way that the length of the tube can be changed so as to make a difference in its pitch or key. The parts which replace each other are called crooks. The change is not made when the instrument is being used, but the tube remains unchanged during any one performance. It is evident that to secure uniformity, trumpets should be precisely alike

in form and material. Brass is beyond question the best material for all metallic wind instruments.

It is now possible, to get from different makers in our own country, brass instruments that are equal to the best that are made in the world. The best performers with Seidl and Theodore Thomas use American instruments. The trumpets used in the army should be from the same maker, and they should be exactly alike in all physical properties.

The trumpet is the most simple one of the large class of wind instruments of which it is a type. The class comprises all the brass instruments in a military band,—cornets, French horns, trombones, baritones, tubas, etc. The distinguishing characteristic of this class is the mouth-piece. For the larger instruments,—the trombones, tubas, and baritones,—the mouth-piece is considerably greater in diameter; and for the French horn it is much longer or deeper; but for every instrument of the class, it is essentially the same. And what is more important to our purpose, it is used in the same way. A cornet, for example, might be described as a trumpet with three valves. Its mouth-piece, which is like that of the trumpet, is used in precisely the same way. If a trumpeter has skillfully and fully acquired the art of producing the tones on a trumpet, he has mastered the mouth-piece of a cornet. It would remain of course for the trumpeter to master the valves, in order to pass from his trumpet to their use. But the use of the valves is a minor part. An especially skilled performer on the cornet has declared that the proper use of the mouth-piece comprised four-fifths of the use of the instrument, and that it comprised moreover the part which was essentially artistic.

It follows that a trumpeter who has been thoroughly taught his art, and who has natural gift to aid him, can with comparative ease, acquire the use of the cornet, French horn or alto. These instruments comprise from 30 to 40 per cent. of all the instruments in a military band.

It is fair to say that the wind instruments which are not brass, would offer little or no advantage to the trumpeter. In these instruments, in which the tube is made of wood instead of metal, the mouth-piece is very differently made and used. These comprise the reed instruments,—clarinets, bassoons, and oboes; and the flutes and piccolos. A piccolo is simply a small flute pitched one octave higher.

I may say briefly of the reed instruments that the mouth-

piece of a clarinet is tapered so as to be quite small, and it is fashioned much like a boy's whistle. The end is cut in a slope of about 60°, and on the opposite side a rectangular hole communicates with the interior of the tube. A thin piece of bamboo, called the reed, covers the opening. As the air is impelled from the lips against the reed, it vibrates rapidly, and gives the instrument its reedy tone. The sloped side of the mouthpiece is usually held uppermost, and the nearly flat reed is pressed with some force against the nether lip. The mouthpiece of the bassoon and the oboe is formed entirely of two thin pieces of bamboo curved together so as to form a sort of flat, sharp ended oval, which is inserted quite between the lips. These reed instruments are intended to imitate somewhat the work of old Pan, when he makes the winds go trembling through the dry stems of the reeds on the river bank.

The field musician would not be available to do skilled work on the class of instruments last named, except by the acquisition of a new art, which, if possible in any case, would be of doubtful expediency. Neither is it intended to say that all trumpeters would do good work with the cornet. It is simply true, that if only those trumpeters were retained in the service who had perfectly mastered their instrument, and who had gift for its use, there would not be far to seek for a performer on any brass instrument. He might not always prove a great success on the more complex instrument, but he would certainly have acquired before he touched it, the essential part of its most artistic requirement. I recall,—yes, I shall never be able to forget—how, many years ago, when a part of the troops and all the field music was away from the post, a swarthy Italian was sent from the band at Old Point to sound the calls on a b-flat cornet. It was a revelation. His tattoo, in the summer evening, was like a vesper hymn; and his sick-call in the morning wakened one with a melody that swept all the mosquitos and tangles out of the hot night, and gave a feeling of gladness, that one's lot was cast in a pleasant land, where the robins came, and where a dusky Dago sounded sick-call on a cornet. In sounding these calls the musician used his cornet as a trumpet. That is to say, he did not use the valves at all. He was simply an excellent trumpeter, and he could have sounded the calls far better on a trumpet, if it had been mechanically as perfect an instrument. The interruptions in the tube of the cornet where the valves were seated in it, caused interfer-

ences, and robbed the tones of the clear, harmonic purity which the smooth, unbroken tube of the trumpet could have produced.

This is the reason why the slide-trombone is so greatly superior to one with valves, and it shows why a misshapen trumpet full of dents and bruises can only produce broken and mangled discords. In a perfect instrument, the trumpet-tone has a purity and perfection of quality that is hardly equalled by any other musical instrument.

If we come now to consider the training and instruction in music that our field musicians receive, we find that it has not changed sensibly since we commenced to have an army. The small number of so-called music boys at the depots of the General Recruiting Service get their instruction from other enlisted men, not one in ten of whom can read a note of any music whatever. What little these instructors know about the daily calls (and they do not attempt to go beyond them), they have learned by imitating some other instructors as ignorant as themselves. They teach only by inducing the men to copy their own mangled rendering of the calls, and this copying, of course, includes their own labored and inartistic method. The one is incorrect and unmusical, and the other is simply barbaric. One of the best musically educated officers in our army has declared his belief that not one per cent. of the trumpeters in our service can sound the daily calls correctly.

But only a small percentage of our field music comes, as such, from the recruiting depots. The great majority of those in the army become field musicians from being named as such by the commander of the battery, troop or company to which they belong. They are named because some one must fill a place on the muster roll, and some one is required to give some sort of warning for drills and other duties. The commissioned officers are usually entirely unable to instruct them. In fact, no one does instruct them. They are nobody's children—left to pick up what they can from their comrades, and to go on, unrebuked, doing wrong all their lives.

With reference to the duties, other than to furnish music, that are required of our field musicians, probably the most important that has been required in the past, and will be in the future, is to act as orderlies for the transmission of official orders, instructions and messages of all sorts. This class of duties would seem to be one for which they are specially available and one to which they

should be well adapted. Their youth, celerity and sensibility would seem to make them suited to such duty. Yet who of us has ever known in all his service of an orderly receiving detailed and painstaking instruction in his duties from a commissioned officer or by his direction? How is the orderly to know the proper forms of official intercourse? By what subtle instinct is he to understand and practice the formalities of which he has never heard? No doubt we are all too often negligent of the courtesies and amenities of intercourse. For ourselves it can have no excuse, and for the orderly it may seem even more reprehensible, because he is only a vehicle, with whom the form should be mechanical and uniform. If it is not so the fault is not his, but our own. Yet it is probable that the oldest enlisted man in the service, who has been an orderly every few days for twenty years, never has received an iota of anything that could be called careful instruction in these duties in his life.

We have been accustomed to see an adjutant select an orderly from the guard for some perfunctory reason, in no way connected with his duties as an orderly. Simply because his rifle is clean or its manual correct, some ignorant wanderer of the Slavonic race is selected, with the same sublime indifference as to whether he can speak the English language, that the recruiting officer had,who neglected his duty by enlisting him into the service.

Hundreds of enlisted men are doing duty as orderlies every day. Why should they not be instructed in their duties? All the other duties of enlisted men are believed to be efficiently taught. Why is this one so entirely neglected? We spend weary hours over the chemistry of explosives and the principles of ballistics with privates whose dullness comprehends them no more than the doctrines of the Vedas. Are not the field musician's duties deserving of some attention? A message misgiven by him in some crisis might tie the hands of every gunner in an army.

The remedy for the deficiencies of our field music that have been last above mentioned, would seem to rest with ourselves as line officers and to well deserve our careful thought and attention.

The field music of our army comprises one-thirtieth of its entire enlisted strength, or so considerable a portion as three and one-third per cent. I submit that its efficiency is most deplorable, and that it is so in all respects. The present facts are a

distinct discredit to the army, and should seem a reproach to the self-respect of its officers. I do not contend that field music is the most important thing in an army, or that it is even a *vital* matter at all. We could probably find our way around without it, and we could doubtless win battles and succeed in protecting our country without any field music; but if we are to have any let us have something that is not barbarous and stupid, something that is at least tolerably respectable.

In view of the foregoing it seems possible and proper to suggest, even to recommend and advocate, methods to increase the efficiency of our field music. The work should be undertaken at once and with seriousness, care and forethought. Some post or place in the vicinity of New York City should be secured, where the field musicians could be collected and instructed, which should constitute a school and from which they should be sent to the different troops, batteries and companies of the army. At this place boys between the ages of 12 and 18 years should be collected. They should not be regularly enlisted till they had reached a certain age and a prescribed physical development—at least they should not be sent out to regiments. The details, which I only attempt to indicate, should be carefully worked out, and with experience could doubtless be easily determined. No boy should be sent to a command till he had been from one to two years at the school. Probably boys could be taken, provided for and taught, without pay, until it could be determined whether it was desirable to enlist them. Authority should be given to discharge them at any time prior to their being sent to join troops, whenever they proved idle, vicious, incompetent, or for any cause undesirable. After enlistment they should be obliged to serve a specified time—at least three years. They should be enlisted as musicians.

Boys at this school should be taught to read music understandingly, to use the trumpet, fife and drum perfectly, and such other instruments as they are able to acquire. They should be taught the duties of a soldier only so far as to enable them to march well and to fit them to do the duties of an orderly perfectly. They should be taught the rudiments of an English education, this to increase their efficiency and as a justice to them, that they may not grow up to manhood without any education. The foregoing, with such gymnastic work as would assist their physical development, should limit the work of the school.

The manual of such arms as are given them could be acquired when they joined troops, and these arms should be the same for all branches of the service. A high authority in the British service has recently suggested that all musicians be instructed in giving "first aid" to the wounded. I am inclined to adopt this and to recommend that our field musicians be permanent "company bearers," and that their instruction in this duty be given after they have left the school and joined commands. The only military duties then that the field musician would be taught in any arm of the service after joining his command, would be those of company bearer and the manual of the arm he carried. He would be an expert musician and a perfect orderly when he left the school.

Officers with musical knowledge or special fitness should be in charge of this school, and they should be assisted by the very best civilian instructors in music. All musical instruments used in the army should be determined by the authorities at this school, and should be received, inspected and accepted by them.

The work of collecting the boys for this school would be a delicate one, but with great care experience would probably soon determine the best methods. Many children of men who are musicians in civil life could be obtained, who might possess inherited ability. Many children of German, Italian and other foreign parentage might possibly be inducted into the army through this school, with safety and advantage.

If the average term of service with troops was so little as three years our army, as now arranged, would require nearly 250 per annum. This might require twice as many to be collected in each year at the school, for trial and selection. But boys entering the service so young would probably remain many years, unless the offer of larger pay in civil life led them away.

Whenever it is deemed wise and expedient to provide bands for our army, they should be furnished entirely by this school. Musicians, teachers, leaders—all should come from the school. Excellence and most especially, uniformity, could thus be secured. The musicians of the bands should be furnished by promoting field musicians whenever they were found from examination to be fitted. The young boy entering the school would then have the possibility of a fine position in his profession placed directly before him to strive for—because the instructors and band-leaders should be honored and well paid.

It has been suggested that the whole work of instruction in music for the army should be done at the headquarters of the different regiments. The objections to this plan seem to be of the gravest kind, and there do not appear to be any good points about it. Very few of the regiments would probably have really first-class instructors. No two of them would be alike in any case. Each one would have its own particular individuality. Whenever troops came together everything would be different—music, instruments and methods. There might be an improvement over what we have now, but nothing like harmony or perfection would be possible.

I doubt very much the propriety and wisdom of the effort that is now made to maintain band music in the different regiments. It certainly cripples the service to a considerable degree. If this were entirely done away with the army would lose very little good music and its useful strength would be increased about three per cent. The people who had been accustomed to hear it would remark on its absence, and would probably be a potent influence to bring back in its place something incomparably better.

Establish with painstaking care the school for field music and equip it in the best possible manner. Then abolish entirely the nondescript makeshifts now in use as bands. Do these two things at once and the longest steps will have been taken in the path that shall lead us to have authorized bands, of a quality equal to the best in the world.

It is easy to say that all this requires legislation, and with this shifting of the burden drop the whole thing out of mind. It would probably not require any immediate legislation, but, in any case, we ought to consider that we are not charged with the responsibilities of legislation, and that if we do all the good things we can in the spheres we do occupy, it will not be our fault if only a part of the human family is saved hereafter, or even if the whole of it be lost.

We undoubtedly have an abundance of gifts and abilities among us, and it is fair to recollect that the fault is not usually with the fine twigs and small leaves at the ends of the branches, but that as our rank becomes higher and our authority greater in the service, our responsibility for remediable defects must be commensurate therewith.

A BIT OF HISTORY.

By Colonel H. C. WOOD, Assistant Adjutant General.

THE following bit of history may prove of interest, especially to those who have served at that picturesque but rather isolated post, Fort Canby.

Portland, Oregon, December 21, 1874.

To the Commanding General, Department of the Columbia, Portland, Oregon.

Sir:—I have the honor to invite your attention to the name of the Military Post—with the three batteries on the bluff—at the mouth of the river, on the north side, in Washington Territory, and now known as Fort Cape Disappointment.

It appears that in 1862 the Engineer Corps commenced laying platforms for guns at this point, but that the post was not garrisoned until April 5, 1864, and by Company "A", 9th Infantry (Captain W. H. Jordan), under instructions from Brigadier General Benjamin Alvord, U. S. Volunteers, then commanding the District of Oregon.

In a communication dated Fort Vancouver, April 14, 1864, to the Assistant Adjutant General, Department of the Pacific, San Francisco, General Alvord, referring to the arrival of Captain Jordan at this post, remarks: "I notice that he dates his letter "Fort Columbia.' I have disapproved of this and desired him to designate his position as Cape Disappointment, W. T., until further orders. I respectfully refer the question of a name to the General Commanding the Department. The geographical name will answer until a name can be given by higher authority."

So far as I am informed this post has never receive an authoritative appellation by the Secretary of War, as provided for by paragraph 717 of the Regulations of the Army.

History informs us that Captain Robert Gray, of the Ship *Columbia*, of Boston, entered the Columbia River May 11, 1792, and anchored in or near what is now known as Gray's Bay. The day previous to leaving the river—May 19—Gray gave it the name of his ship. He called the southern point of land "Point Adams," and the northern promontory "Cape Hancock." These entries are written in the log-book of the ship. It seems to be

well authenticated that the *Columbia* was the first vessel that ventured into this port, and that to Captain Gray belongs whatever renown should attach to the name of the discoverer of this majestic river.

Indeed, as early as August, 1788, Captain Gray, then master of the sloop *Washington*, was convinced that he saw indications of the mouth of a river here, and, of course, must have sighted this prominent headland. This expedition (Kendrick and Gray), fitted out in Boston in 1787, had something, too, of a national and official character. It was "provided with Sea-letters, issued by the Federal Government, agreeably to a resolution of Congress, etc." (Bulfinch.)

The commonly received name of this headland—"Disappointment"—is derived from English sources. Bulfinch in his "Oregon and Eldorado; or, Romance of the Rivers," states that it (the Cape) received the name "from Lieutenant Meares, an English navigator, who, like Captain Gray, judged from appearances that there was the outlet of a river at that point, but failed to find it, and recorded his failure in the name he assigned to the conspicuous headland which marked the place of his fruitless search."

Captain Vancouver everywhere speaks of it as "Cape Disappointment"; so in fact do all, or nearly all of the English navigators and writers; but Vancouver was an English commander who followed in 1792 in the wake of the Americans, and some four years later than Gray's first voyage in 1788.

It is a historical fact that Captain John Kendrick, a co-navigator and companion of Gray in the *Columbia* and *Washington*, is the true discoverer of the island, now called Vancouver's Island.

"The injustice done to Kendrick by thus robbing him of the credit of his discovery, is but one of many similar instances; the greatest of all being that by which our continent bears the name, not of Columbus, but of a subsequent navigator," Americus Vespucius.

We know that in April, 1792, Gray communicated to Vancouver information "of his having been off the mouth of a river, in the latitude of 46 degrees, 10 minutes, for nine days; but the outset or reflux was so strong as to prevent his entering."

I have not been able to ascertain at what period Lieutenant Meares sailed in sight of this headland and named it. It was however prior to the voyage of Vancouver.

Nevertheless, the weight of testimony is, to an impartial student of history, to the effect that the information in the possession of the English navigators, of the actual existence of a river in this latitude, was originally obtained from Captain Gray.

To-day, as Victor says, this Headland is the "Cape Hancock of Captain Gray and the United States Government, and the Cape Disappointment of English navigators and common usage."

In any event, as the *Columbia* was the first ship that made a regular discovery of the river and entered within its waters, I submit that to Captain Gray is due the credit, and the promontory and cape should receive, and be officially known by, the distinguished and honorable name conferred upon it by this adventurous mariner.

I recommend that this military station be designated and hereafter known as "Fort Canby, Cape Hancock, Washington Territory," in honor of that distinguished officer and noble man, the late Brigadier and Brevet Major General Edward Richard Sprigg Canby, of whom a brother officer has well written, "he stood among us grand in stature, peerless in form, cultured in mind, and high in station, yet shrinkingly modest in demeanor, truthful, brave, and generous, just and merciful,—spotless in character, and pure in heart, without fear and without reproach."

I am, Sir, very respectfully,
Your obedient servant,
H. Clay Wood.
Assistant Adjutant General U. S. A.

War Department,
Adjutant General's Office,
Washington, January 28, 1875.

General Orders, No. 5.

The Military Post on the north side of the mouth of the Columbia River, Washington Territory, now called Fort Cape Disappointment, will hereafter be known and designated as "Fort Canby," in honor of the late Brigadier and Brevet Major General Edward R. S. Canby, U. S. Army, who was murdered by Modoc Indians April 11, 1873, while holding conference in the vicinity of the Lava Beds, Oregon.

By order of the Secretary of War.
E. D. Townsend.
Adjutant General.

Comment and Criticism.

(The remarks under this head have, generally, been invited by the Publication Committee, which desires that, as far as practicable, these "Comments" should appear under authors' names.)

I.

"The Proposed Deep Water-way from the Great Lakes to the Ocean."

Lieut. Col. William R. King, Corps of Engineers.

A PROJECT of this kind may be considered in many aspects, of which the more important are, 1st, its relation to commerce, 2d, as a military question, and 3d, as an engineering problem. The first two of these are so well set forth in Lieut. Simpson's paper that I shall only add a few facts which may be of interest, chiefly in connection with the third branch of the subject.

The history of the attempts to create and operate a water-way from the Great Lakes to the ocean via the Hudson River furnishes an excellent example of how such works ought not to be carried on. Almost from the beginning, the Erie Canal became a political football and later on it got into the hands of the most unscrupulous gang of ringsters that ever disgraced the Empire State and soon became a stench in the nostrils of the taxpayers, both literally and figuratively.

The name Clinton's Ditch was given to the canal in derision of the canal itself and of Governor De Witt Clinton, its great advocate.

Although the people along the line of the canal were strongly in favor of it, the greater part of the State was beyond its reach, and farmers in eastern, northern and southern parts of the State objected to paying for a canal that was bringing the produce of the cheaper lands of Ohio, Michigan, and other States bordering the Great Lakes into direct competition with their own products. Hence in order to pacify these people it was decided to build no less than ten costly branches of the main canal.

The main canal was begun in 1817 and completed in 1836, but before it was done an enlargement was commenced and finally completed in 1862, the entire period of construction occupying 45 years.

The entire cost of canal and enlargement was $51,600,000. The total length of the canal from Albany to Buffalo was 350 miles and the total height of lockage was 655 feet. The number of locks is 72, and their size is 110×18 feet. The canal prism is 70 feet wide at top, 56 feet at bottom and 7 feet deep.

Notwithstanding all the rascality and mismanagement in building and operating this canal, it has more than repaid the State in tolls and has brought untold wealth to the State by the commerce it has developed.

Not so however with the ten branch canals, some of which have never been completed, while all but four appear to have been abandoned. The total length of these canals was 434 miles and the number of locks 476, or nearly seven times the number required on the main canal. These locks were in many instances built of timber and those first completed would rot out before the last ones were ready for use.

In 1863 the State of New York sent an able commissioner to Washington to urge upon Congress the importance of enlarging the Erie and Oswego canals to admit the passage of gunboats. But although a great war was then in progress which might at any moment involve a controversy with Great Britain, he received very little encouragement and no appropriation.

The plan most favored at that time was simply to enlarge one set of the locks of the Erie and Oswego canals, without attempting to get additional depth, and Captain Ericsson, whose opinion was requested, reported as follows:

"After full consideration of the subject of your inquiry, I have to state that an impregnable iron vessel, 200 feet long and 25 feet wide, constructed on the general plan of the *Monitor*, will have sufficient buoyancy to carry a shot-proof iron turret carrying a gun of 15-inch calibre, with a ball of 450 pounds, and capable of destroying any hostile vessel that could be put upon the lakes. Without coal, ammunition and stores, such a vessel will draw 6 feet 6 inches, and measure 18 feet in height from bottom of keel to top of turret. Before going into action a certain quantity of ballast, in addition to coal, ammunition and stores, will be put on board, in order to attain what may be termed the fighting draught of 8 feet."

This opinion I have given in full as it bears directly on the most important part of the subject, viz.: As to the kind of improvement most needed. If Captain Ericsson's views are applicable at the present time it is evident that instead of a *deep* water-way, what is most needed is such an enlargement of the locks as will permit the full use of the canal trunk as it now is.

The enlargement of one set of locks was estimated to cost only about $3,500,000, though the advocates of the improvement admitted that owing to the inflation of prices at that time it might exceed that amount.

Many projects for the improvement of this great highway of commerce have been started at various times, notably in 1874 when surveys and estimates were made as follows: 1st. Albany to Buffalo, deepening canal to eight feet and enlarging locks to 225 feet long by 26 feet wide, in round numbers $8,000,000. 2d. Albany to Oswego, enlarging canal to 140 feet at surface, 10 feet depth, with locks 185 feet long by 29 feet wide and 9 feet deep on mitre sills $25,000,000.

To gain any considerable depth of water in these canals would be enormously expensive, 12 feet being all that can be carried, at low water, in the Hudson River for several miles below Albany, and the narrow rocky chasm of the Mohawk at Little Falls being a very serious obstacle to canal building.

But the worst opposition to any improvement in the canals comes from the great railway monopolies and from those narrow-minded people who feel that any improvement not directly benefitting them is a rival enterprise and should be discouraged.

Although the military advantages of a suitable water-way for our gunboats to the Great Lakes will be admitted by all, it is unfortunately the rule rather than the exception to neglect such precautions until too late to provide them, and in any future war with Great Britain we will doubtless be as unprepared for hostilities as China was a few weeks ago when assailed by Japan.

Although frequent attempts have been made to improve the Erie Canal and at this writing a plan proposed by the State Engineer for substituting an inclined plane for the flight of locks at Cohoes is under consideration, it must be admitted that the prospect of any radical improvement in the canals is extremely discouraging, and there is great danger that they may be abandoned altogether. No one can doubt that as a business proposition grain, lumber and other heavy and bulky commodities can be transported to tide water cheaper by canal than by rail, and yet such is the grasp of the great railway monopolies upon commerce that although the canals carried almost

exactly the same tonnage of freight last year, as they did 40 years ago, the two principal competing railways carried *nearly forty times as much* freight in 1893 as in 1853. Stated in another way, the two railways mentioned carried *nine times* as much freight last year as the canals.

Returning now to the military aspect of the situation, the question naturally arises, "What could be done to protect our lake cities in case of war with England, with the canals in their present condition?"

The Treaty, supplementary to the Treaty of Ghent, provides that "The naval force to be maintained upon the American Lakes, by His Majesty, and the Governernment of the United States, shall henceforth be confined to the following vessels on each side, that is:

"On Lake Ontario to one vessel, not exceeding one hundred tons' burden, and armed with one eighteen pound cannon.

"On Lake Champlain the same.

"On the Upper Lakes two such vessels."

Manifestly in case of war there would be a race to see who could place a naval force on the lakes first, and at least the earlier results would depend largely on which party made the best time.

We would naturally send a strong force to Rouse's Point, Ogdensburg and Port Colborne or St. Catherines, to prevent the enemy from sending vessels into the Lakes. The Navy would have to seize and arm all merchant vessels on the Lakes, and the enemy would probably do the same, which would result in a kind of "grab game." Small batteries could be thrown up near such places as Buffalo, Cleveland and Detroit and armed with such field and siege-guns as could be scraped together, and the St. Mary's and St. Clair canals would be occupied to prevent their destruction or use by the enemy. At Detroit, Ogdensburg and other points it would be necessary to push across the rivers into the enemy's country and this would be done under an unpleasant recollection of how such attempts resulted in the War of 1812.

The only use that could be made of the canals in their present condition would be in passing small tugs, launches and torpedo boats to act as auxiliaries to the improvised fleet of merchant vessels.

One possible advantage might be taken of the canals, if there are no insuperable obstacles in the matter of construction, viz.: A fleet of double-hull or catamaran gunboats might be built on the Atlantic Coast and in case of war sent through the canal in sections, each hull being complete in itself with propeller, engines and boiler so that they could be united and armed when they reached the Lakes. This, however, is a matter for naval architects and is only mentioned as a possible contingency and would at best be only a makeshift as compared with "a deep water-way" if such a thing could be secured.

II.

"The Military Service of Indians."

Captain James D. Glennan, Ass't Surgeon, U. S. A.

So much has been said by the opponents of the Indian soldier from the time of his enlistment, that I was very glad to see Major Ewers' article in their favor. While there have been failures due to various causes, perhaps not altogether the fault of the Indians, nor of the officers in charge of them, there have been several companies that have fully justified the experiment of the military service of Indians. When the Indian companies were organized, it was thought that they would give the young Indians a regular and congenial occupation, discipline, habits of industry,

a knowledge of the English language, and a control over the people of their tribes. Some of these companies have accomplished all this and more, and I think that it is time for those who have seen these good results to speak of them.

More than three years ago Troop "L," Seventh Cavalry, was organized at this post (Fort Sill), composed of Kiowa, Comanche and Apache Indians, and has been kept at the maximum limit of numbers, and in a state of thorough discipline and efficiency to the present time.

These Indians were the usual blanket Indians, without any knowledge of the English language, or the power and resources of the Government, no knowledge of the white man's methods, no occupation, discipline or responsibility. They have steadily developed mentally and physically, and the change for the better is something that has never been accomplished before in the history of the Indian. They have performed every military duty that the white soldiers have done, and I have heard no complaint of the manner in which they have performed it. They are obedient and respectful, faithful and conscientious in the performance of duty, and none are more faithful or better soldiers than the older men, who were the terror of the frontier a few years ago. The daily contact with white men, and the knowledge of the English language, which they have thus acquired, have enabled them to understand what is going on about them, the methods and aims of the white man, and have incited a spirit of emulation. Their minds have broadened greatly, and their influence on the people of their tribes has been marked, and always for good. They are the strongest hold the Government has ever had on these tribes. What has ever accomplished such a result before?

The health of the troop has improved steadily. During the first year or two there were several discharges and deaths on account of tuberculosis, some of them having escaped detection at enlistment. No case of the kind has occurred now for more than a year, and the health of the troop is better than ever before. They have learned many sanitary measures, and added to their articles of diet, which will be a benefit to them in health, and encourage them to cultivate vegetables on their farms when they leave the service. These men have had access to the Post Exchange, the same as white soldiers, but drunkenness is uncommon, and a large number do not drink at all, a self-control not usually attributed to the Indian. Many of them have saved money, have built houses, and have added stock to their farms. The families of these soldiers have been in camp near the post. Their condition has also improved; they are learning better methods of living, and their camp is kept in a clean, sanitary condition now, as a matter of habit, without inspection or urging. I do not believe that the results of this discipline can be entirely lost. Some time ago an Indian was transferred to the Hospital Corps. He is faithful and intelligent, and his service has been satisfactory.

Many of these men are now on their three years' furlough. I agree with Major Ewers that it is of no significance whether they go out by purchase or otherwise. Many white soldiers avail themselves of this legislation, and it would be natural for the Indian to feel the restraints of the service at times. But, as a matter of fact, most of them will not take their discharges at the end of their furloughs, nor would the effects of their three years' discipline in the army be lost if they did.

It is said that all this is good for the Indian, but not for the army; that it is not the affair of the army to train them, but I think that the army, in time of peace, is a training school, and I can see no reason why the Indian should not have the benefit of it as well as the negro. But it affects the army in a more vital way; this very experiment may have saved many lives that Indian troubles would have sacrificed, only to leave the Indian worse off than before.

These companies have been successful, sometimes with much opposition, and under

difficulties that it would be out of place for me to mention, and I think that as long as the Indian will enlist they should be retained in the service. The Indian is a reasoning and reasonable being, and can be used for almost any service. What difference does it make whether it is feasible to move an Indian company from the Indian territory to Dakota, or from Dakota to Governor's Island? Why should they be moved? they are doing much good where they are.

I think that when those who have been acquainted with the Indian soldier will tell all the results that they have seen, good and bad, it will be found that much general good has resulted from the experiment.

III.

"The Non-existence of Martial Law Proper."

Judge Thomas M. Cooley.

ANN ARBOR, MICH., NOV. 9, 1894.

H. C. CARBAUGH, 1st Lieut. 5th Artillery. Dear Sir:—I have read with much interest your article in the JOURNAL OF THE MILITARY SERVICE INSTITUTION ("The Non-existence of Martial Law Proper"), and desire to thank you for sending it, and to add that, in my opinion, it is sound and right. You have, considering the differing views expressed in influential quarters, performed a public service in giving the subject this attention. Hoping that you find your public duties agreeable as well as useful, I am

Very respectfully yours,

THOMAS M. COOLEY.

Reprints and Translations.

MODERN RIFLE PRACTICE.

By Major JOHN M. MACARTNEY, British Army.

From the United Service Magazine, London.

IN all tactical combinations of the three arms infantry is supreme. Ninety per cent. of wounds inflicted in battle are bullet-wounds, yet the scientific capabilities of modern small-bores are neither studied nor understood by the average infantry officer. At Bisley and other great gatherings of riflemen verniers and wind-gages are common enough; but nine captains out of ten who were asked the number of degrees of elevation required to adjust the backsight to 800 yards, or what elevation they would give to enable their men to shoot over a hill, so as to cause the bullets to strike in a given space beyond it, would stare at the questioner in ignorant amazement. Artillery officers have brought the science of shooting by angles almost to perfection, whereas with the rifle the only example of anything of the kind ever having been accomplished is that of the Turks at Plevna. With rough and ready materials found on the spot they made rests for their Martinis and managed to inflict serious loss on the Russians at 3000 yards' range. Rifles have improved since those days and are still improving. Many things point to the modern small-bore becoming in the near future the weapon *par excellence*, where a man-killing machine only is required. Its cheapness, great penetration, and immense range will cause it to enter into competition with artillery in phases of the fight where hitherto it has been looked upon as of no account.

Against intrenchments of all kinds and hostile artillery the field-gun will still be necessary; but in future battles infantry fire will afford it the greatest assistance, particularly in the earlier stages of the combat. Artillery officers claim for their arm that the effect of its fire is only controlled by the range of vision. The same remark applies with equal truth to the rifle of to-day. Infantry fire may not reach as far as artillery, but the ease with which infantry can be posted, the small target it offers, and its great mobility, more than compensate for this defect. Practically, the range of modern rifles is as far as a man can see to shoot.

But it is not only to the scientific capabilities of the rifle that I wish to draw attention. If the enormous power contained in modern small arms is to be developed, the instruction of the soldier who uses them must be carried out in a very different manner from that in vogue at present. With an established system of communication between the larger units in the

field and the control of the fire unit, commanded by one supreme head, who is kept constantly informed of results from posts of observation as in the artillery, there is practically no limit to the effect which rifle fire may produce on troops and guns at extreme ranges. Smokeless powder will affect artillery far more than infantry. Guns must be more exposed, for they cannot come into action behind a screen of smoke. Taking up positions within 2000 yards of posted infantry will become extremely difficult. Whether batteries can dislodge it at that range, if well covered, is very doubtful.

The following experiment carried out at Hythe is an example of what may be expected from long-range rifle fire. Thirty-eight men in two squads were concealed on a hill, at an estimated range of 2300 yards from the sea. An officer was posted on the flank to take observations, while those watching the experiment were placed behind a tower close to the shore. Each squad fired five volleys at a supposed landing-party. The bullets struck about 20 yards from the shore, and covered a space of about 30 square yards on the water. Although only 19 men fired at each volley, a landing-party would have suffered considerable loss. Ten rapid volleys were then fired at an estimated range of 1850 yards, the target being 220 dummies, representing 2 companies in attack formation, with six guns and 18 gunners. The depth of the formation was 140 yards. The wind was blowing half a gale, but the light was very good. Fifty-eight hits were made, 6 of which were on the gunners. The direction of the fire was then changed, and 10 volleys fired at 134 dummies, representing a company, attacking. Depth of formation, 80 yards. Range, 1400 yards. Result, 113 hits.

A battery firing shrapnel would no doubt have given better results, but the difficulty of posting guns would have been very great, and the mark offered by them to hostile infantry or artillery considerable, whereas in the case of riflemen it was practically *nil*.

Doubtless infantry is often powerless unless supported by artillery; but on the other hand occasions frequently arise, whether from accident or other causes, when the latter arm cannot be brought into action. Then infantry must depend on itself, and clear the way for its own shock-action. Long-range volleys fired by battalions deployed in the earlier stages of a fight will certainly, in future battle, where a clear field of fire is possible, afford valuable assistance to the gunners. At 2500 yards, infantry in line offers a very small mark, while volleys poured at that range into troops confined in a position would probably be very effective as a demoralizer. If the attacking force is at all concealed, it is almost impossible to discover its locality when using cordite; while, on the contrary, the position of the defense is generally known.

The following is an instance of what may be done by troops entirely concealed and practically safe. At Peshawur, in 1885, I tried some rough experiments in firing at a target concealed from a squad. The extreme range it was possible to obtain was 800 yards, and the rifle used the Martini-Henry. A mud-wall, 3½ ft. high, completely hiding a first-class target 8 ft. by 6 ft., was built across the range about 400 yards from the butts. By means of the

Table of Trajectories I calculated the required height of a mark placed 200 yards from the squad in the line of fire; this I checked by means of an observation with an ordinary plane-table. Each volley was noted by me with a telescope, and the result communicated to the men. On the first day, January 18th, 10 volleys were fired, resulting in 22 hits. Next day 20 volleys were fired, and 57 hits made. Military men have not yet realized that the introduction of a far-reaching magazine rifle, capable of destroying a 9-inch brick wall at 500 yards, has altered completely the nature of fire-action. Up to the present, infantry have been kept back until a way was cleared for them by artillery; but now that they are armed with a weapon, itself capable of inflicting serious loss at extreme ranges, why should they be so any longer? Let them take their part and assist from the beginning, when it is possible to post them within 2000 yards of a position.

The army, in spite of improvements in firearms, clings to old traditions and old methods, practically to old formations. The rifle-range, instead of being the drill-ground of a battalion, is subservient to the barrack-square. To march past like a stone wall is still considered a greater achievement than to be perfect in fire-control drill. Has a battalion ever been known to parade on the range or assist a company in its field practices when going through its course? Yet it is the rule to suspend musketry one day a week during the drill season, and march the troops engaged in it often miles, to take part, probably, in a show parade. But a change is coming. The distinguished commandant of the school of musketry admits that bulls'-eyes are not after all the *raison d'être* of a soldier's training, that there is still something to be learnt, even after a man has mastered the art of making possibles. The fire discipline required in a modern army can only be obtained by the most careful training, firstly of the leaders of fire sections, and afterwards of the sections themselves.

The greatest number of individuals one man can hope to influence directly during the turmoil and heat of an action is twenty. The strength of a fire-unit should not exceed this number, but it must be as completely under the control of its commander as a single gun in a field-battery. It must be possible for him to concentrate its fire rapidly on a named object, or alter its direction at will. No firing should take place without his direct order, and only such as he shall determine. All elevations must conform strictly to the distance named by him, and any attempt to use others be firmly repressed. The squad should be taught that collective not individual fire is necessary on the battle-field. The fire section must submit to become a living machine-gun in which individual enterprise has no place. The commander himself must take his instructions from his immediate superior. The four fire sections of a company worked in this way become an all-powerful weapon in the hands of a skilful captain.

Under present regulations it is quite impossible for any section leader to instruct himself, still less his unit. Save when at military training, he never sees his nominal squad. Then there are so many other things to occupy the time. Fire-discipline must perforce take a back seat. The only solution of the difficulty is to insist that fire units parade at least once a month throughout the year under their own leader for instruction. Men are supposed to

be posted to sections, but for various reasons the order has become a dead letter.

The antiquated parade that takes place weekly in every battalion, known as the musketry drill, is worse than useless. Men are jumbled together anyhow, hardly ever under the same instructor, half an hour is spent by non-commissioned officers in repeating a formula, learnt by rote, with the awful dread always present to their minds that the adjutant will detect a word left out, and order extra drill. The men snap at little black and white marks on the barrack wall and stand easy alternately, while a bored subaltern walks up and down anxiously glancing at the slowly-moving hands of the clock. Abolish this parade, and devote the time gained to practical instruction. Aiming and snapping at marks are absolutely necessary to establish that union between the brain, hand, and eye, required in good shooting. It enables a soldier to align his rifle on the object the instant it touches the shoulder, and to press the trigger at the same moment. But this standard is not acquired by a few minutes' independent firing on the barrack square at a fixed mark. Besides the system taught by regulation directs the soldier first to come to the present, and then to take a long and steady aim. "Come down again," is a constant order at musketry parades. This style may be suitable to the butts at Bisley, but it is entirely opposed to all conditions under which soldiers shoot in battle. An ideal soldier shot is one who can drop a galloping horse, or stop an advancing man at 400 to 500 yards, with certainty. The ideal is very rare, so it is necessary to put up with the best possible imitation. It must, however, always be borne in mind that it is only by constantly striving after a perfect standard, a good one can ever be obtained.

A game shot is the best possible model for a soldier. The following example of how such a shot was made may be interesting, as well as instructive. A friend, who himself owned large preserves, came out shooting year after year, but seldom touched fur or feather, not, however from want of trying. When an occasional shot did take effect the line waited in eager expectation while the beaters searched, generally in vain, for the quarry. Sometimes the mangled remains of a close shot were discovered. Hosts swore below their breath, and keepers above it. But he was a popular man, and his own covers were well stocked, so he was tolerated. Every season he tried a new gun, but the result was always the same. He shot and missed with monotonous regularity, till one year he came out on the first, as usual; beyond that he had not a new gun; no one noticed anything peculiar. He took his accustomed place on the left of the line—it was considered safe—and the beat commenced.

Presently a brace of old birds rose a little to his left. He promptly knocked them over, right and left, in the most workmanlike style. Every one stopped, while beaters, keepers, sportsmen, and even the pointers stared in blank amazement, as he gathered them without a word, and consigned them to the bag. Throughout the rest of that day no one shot better or added more to the bag than he did. Needless to say, congratulations were numerous; every one wanted to know what had happened, but he was silent as the grave.

Some time afterwards I met him at a pigeon match, knocking over the rocks with unerring certainty. Perhaps the winning of a valuable cup melted his heart, for he confided in me how he had become a shot. In a disused loft he had fixed up a swinging apparatus, which he could work in any direction with his foot. To this he attached a tennis ball. As it swung he covered with his gun and snapped. By degrees he found he could cover it the moment his gun touched the shoulder. Then he substituted a lighted candle in a framework for the ball, and fired at it with small charges of powder only. When he was able to extinguish the candle, he adjourned to a field, where bottles were swung on the same principle. As soon as he learnt to break these regularly, he tried his hand on clay pigeons. In a little over two months he was a good shot.

It is not possible to instruct recruits in this elaborate way, but to provide moving targets for aiming drill is not difficult. When they can align the sights from the tripod, the men should be taught to aim at objects in motion only. Moving targets for this purpose are inexpensive, and easily made. Painted canvas fixed on wheels, or a sandwich man perambulating the barrack square.

Experienced riflemen know very well that aiming at a fixed mark will never teach them to hit a moving one. On the contrary, a man who is a good shot at an object in motion seldom has much difficulty in hitting a target at rest. In regard to aiming, there is a curious anomaly in our regulations, from which most foreign armies are free. We place an accurate and expensive rifle in the hands of the recruit, and give him an exhaustive and necessary dose of theory. It is impressed on him that if he uses the fixed sight, a man can be killed at any distance up to 500 yards. There is no necessity to alter it when he reaches the shorter and more deadly ranges. Then Private Thos. Atkins, Jr., is marched to the range, and placed 200 yards from a target, with a real bullet and real powder in his rifle. Naturally he places his sight at the fixed point, and comes to the present. "Come down, my man," says the sergeant-instructor, "and look at your sight. Did I not tell you to put it down as far as it would go?" He takes the rifle, and pushes down the sliding bar as far as possible. The recruit, having received a free education, asks, "Then what is the use of the fixed sight?" The sergeant-instructor is puzzled, and replies, "Go on with your shooting."

Why the bar is not screwed down at the fixed point, and only allowed to be moved for match shooting, is a thing "no feller can understand." On most foreign rifles the fixed sight is the first. If a recruit is taught that better shooting can be made by lowering the bar he loses all faith in it. Accurate handling and command of the weapon are necessary to good practice, and the men should be carefully grounded in the rifle and bayonet exercises before going on the range.

Formerly much store was set on position. All sorts of cramped attitudes were insisted on, in order that the appearance should be uniform. The sealed pattern, no matter what peculiarities a man possessed, reigned supreme. In these days the tendency is often too much in the opposite direction. Recruits are allowed far too much latitude when at drill in se-

lecting positions. It should be impressed on them that regulation positions are the best, and the nearer they can conform to them, allowing for any peculiarity in the shape of their bodies, the better they will shoot. Limbs, however, must be free and unconstrained. Kneeling should be carefully taught and constantly practised. It is much disliked, but it is the only fighting position. Not once in a hundred times could a soldier see to shoot from the prone, when advancing to attack. Lying down is useful to obtain cover. It is seldom possible to fire at service objects when lying down. In the field practices every encouragement should be given to shoot in any position from which the target is visible; to use all cover and any rest that can be obtained for the rifle. Stones, banks, and logs, or any object likely to be met with on service should be scattered over the ranges.

To turn to another subject: in targets there is much room for improvement. Fixed marks are all very well for recruits. As soon, however, as they can make a fair percentage of hits, their attention should be turned to practical work, but until they can achieve this, classing them as trained soldiers is misleading. It retards the instruction of others, and does not improve them. Bulls'-eyes on fixed targets should be placed one-third of the way from the bottom, not in the centre. The great object is to get men to shoot low.

The difficulty of obtaining ground at some stations permitting of extended operations, must ever be a great factor in retarding the instruction of infantry. The establishment of large camps has to a certain extent overcome it, in the case of artillery. It is to be hoped a move in the same direction will shortly be made for musketry purposes. On the smallest ranges, however, much can be done by the introduction of movable targets. The military mind is so imbued with the idea, that anything not minutely accurate and symmetrical must be wrong, that it is very difficult to get soldiers to adopt targets at unmeasured ranges, and of dimensions not sanctioned by tradition. They imagine that good patterns on fixed targets and neat registers are of more importance than is real utility. There is consequently in the service a rooted objection among commanding officers and district inspectors, to moving and surprise targets. The fear is always present that officers may take advantage of any latitude allowed them, to let their companies shoot under more favorable circumstances than others. These objections will never be removed till figures of merit and the present system of awarding prizes are abolished. Why should different companies of the same battalion not shoot under different conditions and in different practices?

"How could I work out the figure of merit?" asks the assistant adjutant in dismay. "I should like to know how prizes could be awarded," says the colonel. So we go blundering on, making men shoot under impossible conditions for fear, lest a billet could not be shown for every bullet consumed, and returns rendered with neatness and despatch. Common-sense says, hand over the prize money to each commanding officer, to be competed for as he considers best under the circumstances. Let him furnish his scheme to the general officer for approval. But common-sense has a hard task before it breaks down old traditions. A regulation standard of

good, bad, and indifferent is easily fixed and companies would rapidly improve in practical shooting under enterprising commanders.

I have always advocated that prizes should be awarded to teams, or sections, and not to individuals. What was true ten years ago is much truer now. Then collective shooting was not nearly so important as it is to-day. What is required is a good average standard, not the production of a few brilliant shots. I have known many such, perfectly useless as soldiers.

I was much impressed when an adjutant of volunteers at the perfection to which individual shooting had been brought. About ten per cent. of the battalion were good shots; some of them brilliant marksmen. The remainder could not hit the proverbial haystack. Everything in the battalion gave way to the shooting men. Large sums were distributed among them annually, in prizes. Wherever they went they brought credit on the corps, but they did not attract the mass of the regiment to the range. The battalion had excellent rules, but year by year the same men carried off the prizes. I introduced team prizes for volley firing. Great interest was taken in it. Teams were worked up, and prizes carried off by men who had never won one before. Many more men joined the clubs, and the volley firing of the battalion improved in a marvellous manner.

Surprise targets of canvas covered with paper can be cheaply fitted up on any range. They should be worked by a short arm, to which a line is attached, the frame work fastened on to the ground with iron tent pegs. These targets can be lowered out of sight, or raised into view at will, by men placed either under cover or on the flanks. At Hythe there is a cheap and ingenious contrivance on rails for advancing figures. During the advance the figures disappear and reappear four or five times. The truck is very light and easily worked. It could easily be erected on any range at a small cost, but as it is a permanent structure, it is hardly fair to expect regiments which are constantly moved to undertake the expense. The regulation target is much too high for trained soldiers to shoot at. 3 ft. 6 in. to 4 ft. 6 in. should be the limit. A man advancing at the double seldom exposes more than 4 feet of his body in elevation. The targets at Hythe are numerous and varied. Although it cannot be expected that we should obtain the same variety on smaller ranges, still a sufficient number should be supplied, in order that some idea may be obtained of the object troops are required to hit in the field. The element of surprise enters so largely into all combats, that it is necessary to teach the men to rely on their leaders when unexpectedly attacked from an unsuspected quarter, and to accustom commanders to act with coolness and decision. Practice at surprise targets appearing suddenly at unknown ranges should therefore form part of every soldier's annual training. When the magazine is used, volley firing should invariably be the form of fire adopted, and the men instructed to wait for the commanders' orders.

No doubt in almost every fight a time will come when the fire gets beyond control, but the longer it is deferred, the better. When soldiers begin to shoot at their own sweet will, the firing becomes wild, besides, when once the line is committed to independent firing, it will only cease when the last cartridge has been expended. When shooting at long ranges on objects at

unknown distances, infantry officers are never taught to watch the result of the fire. The artillery system of bracketing to find the range is very satisfactory. If introduced into the musketry regulations it would in all dry and sandy countries, where a dust is thrown up, afford useful information as to the range. For instance, a company fires a volley with the 1000 yard sight, the captain observes with his glass that the dust is thrown up in front of the object. Then he orders another at 1200 yards. This shows no result, so it is over the mark. He then knows the range is between 1000 and 1200 yards. Infantry will probably find this system very useful when opposed to artillery. These combats are likely to be of frequent occurrence in the future, so perhaps, a few remarks on the engagement of a battery may not be out of place.

Until a field-gun has found the range it is comparatively useless. At Okehampton, in 1892, I carefully timed the batteries ranging. A smart commander will find it in about nine minutes from the time his gun layers take up a position. The moment infantry detect them they should deploy and move to the front. In five minutes they can advance 400 yards. Then the battery is thrown out and must range again. A couple of volleys will retard this. The infantry should continue the forward movement firing during the halts, and if the battery is not supported by rifles it must retire.

At Okehampton, I saw three batteries firing at a moving object, between 1000 and 200 yards. At Hythe, last October, a similar experiment was tried by thirty-eight rifles between 800 and 200 yards. In both cases, however, the destructive zone was about 600 to 200 yards, and the object fired at very similar. At Hythe, however, the target being on rails moved much faster than at Okehampton. The damage done by the infantry fire was far greater than by the artillery, and this, I think, was due to the difficulty experienced by the gunners in changing their aim with sufficient rapidity to keep time with the advance.

The supply of ammunition in the field is the pressing problem of modern tactics. In the British army little has been done to solve it. Save in a few favored centres the subject has never been seriously tackled. Throughout the infantry, regimental ammunition carts are practically unknown. Can a system be expected to work smoothly if only introduced amid the excitement and dangers of a campaign? During the fire-action it is of supreme importance that the executive officers in the firing line should devote all their energies to the control and direction of the fire. It is, therefore, advisable to relieve them of all anxiety and responsibility in regard to the supply of ammunition.

The officer in charge of the regimental cart should arrange for a continuous flow to the front the moment his battalion is committed to the fight. He is, comparatively speaking, removed from the heat and excitement of the combat, and therefore more capable of deliberate action. He should never miss an opportunity of filling up from the next reserve. To keep empty carts one moment unnecessarily under fire is madness. Delay in bringing up fresh supplies may prove fatal.

We have by no means as yet reached finality in the improvement of the rifle itself. The Roumanian government have secured an arm 12¼ ozs.

lighter than the Lee-Metford, with far superior penetration. It is capable of piercing a steel plate ⅜ of an inch thick at 100 yards, whereas the Lee-Metford failed under similar conditions at 50 yards. At 200 yards, twenty-four inches of oak baulk were penetrated as against fourteen inches by the Lee-Metford, Mark II. In the Roumanian rifle the calibre is .256, and the bullet weighs 162 grains. In the British the figures are .303, and 215 grains respectively. The superior lightness of the Roumanian cartridges is a matter of great importance as the soldier can carry more.

Owing to the tendency of modern tactics towards envelopment as opposed to penetration, infantry fire must be developed early in the combat. In future battles, rifles of enormous range, under intelligent control and ably directed, will surround positions with a ring of fire impossible to withstand. It seems absurd under these circumstances, considering the far-reaching power of the weapons in the hands of infantry, to hold back a fraction of men 150 to 200 yards in rear of the fighting line. They are equally safe and can use their rifles in the front line itself, but in rear they only add to the depth of the formation and increase the danger. Of the 113 hits made on the 134 dummies at 1400 yards, no less than 77 were on the supports. Why not abolish them, by at once placing them in the fighting line and keep the Reserve as far out of harm's way as is consistent with its being able to afford support?

ELECTRIC LIGHT PROJECTORS FOR COAST DEFENSE.

Translated from the *Rivista Marittima.*

By Staff Engineer T. J. HADDY, R. N.

*From the Journal of the Royal United Service Institution.**

GENERAL REMARKS.

WHEN the electric light projectors were introduced on board ships with a view of discovering the enemy and guarding against sudden and secret attacks by torpedo-boats, many other useful applications were found for them, and it would appear that one of the most important of these is the defense of the coast, for which service they were very soon appropriated, so that at present we may say there is not a single harbor of any importance in the defense of which a certain number of projectors are not employed, and which are generally of a more powerful description than those fitted on board ships.

Although many years have passed since their introduction, and numerous experiments and accurate researches have been made by the principal navies of the world, we cannot but admit that even now great uncertainty still exists in the opinion of the most competent judges, both as regards the value of this arm of the defense and the best method of employing it. It is very certain, however, that the ranks of its adversaries have been con-

*By permission.

stantly increasing, and have now become most formidable. They do not as yet call for its abolition, but assert however most positively, that the projectors should not be used on board ship except in special cases, and that the unconditional employment of them instead of being useful is always exceedingly dangerous. These are serious questions, which deserve the most accurate study and the fullest inquiry, and which would perhaps lead to results which would be indisputable, when we consider that, unlike other arms, they can be tested under conditions almost identical with those which would obtain in real warfare. The projectors destined for coast defense certainly merit the same attention as those which are carried on board ships.

NECESSITY FOR VARIOUS KINDS OF PROJECTORS.

The projectors for coast defense are employed under more favorable conditions than others, for the following reasons: 1st. They can nearly always be placed at a distance from the fort or battery, the target of which they are called on to illuminate, and so that the position of the observer is the most favorable one possible. 2d. They are not subject to restrictions of weight and space, and can consequently be more powerful than those on board ship, with increased efficiency. 3d. For the reasons stated above, an arrangement can be adopted which affords protection for the engine and dynamo, the conductors, and also in part for the projector, leaving only the lens itself exposed. In certain cases the latter could also be protected, and the luminous rays still usefully employed. The conditions by which the number of projectors on board ship is limited do not exist on shore, where the number can be determined in accordance with the necessities of the locality it is wished to defend. We may, therefore, allow ourselves to be guided in the determination of this question entirely by the considerations which we will bring forward. We consider that a projector cannot be expected to yield satisfactory service unless a well-defined task is assigned to it, clear and precise in every circumstance; and considering the numerous services which are required of projectors in the defense of a harbor or roadstead, we should apply to them the principle of the division of labor. We shall then have projectors for the protection and working of the obstructive defenses, those for searching the horizon, and finally those destined for illuminating the ships of the enemy when discovered, in order that the guns of the forts may be brought to bear on them. With a view to clearness we shall name these three descriptions of projectors—mining, exploring and aiming projectors. The first will illuminate the launches, torpedo-boats, and small vessels which may attempt to interfere with the obstructions, so as to keep them under the fire of the batteries told off for the protection of these obstructions, and also to show up any ships which may attempt the passes protected by observation mines, so that the latter may be exploded at the proper instant. It will be seen at once that the duties entrusted to these projectors are sufficiently numerous and important, and that the efficient performance of them would be seriously compromised if the duty of exploring the horizon were to be added. Indeed, if these two services were to be entrusted to one single series of projectors, the enemy's ships might, by drawing attention to themselves,

monopolize their action, and so leave a free field for swift launches and torpedo-boats to play havoc with the obstructions by means of grapnels, small torpedoes, etc. By showing themselves for short and flying intervals at a distance of 4000 metres from the projectors, the ships would be visible with difficulty and very indistinctly, and the defensive batteries would hardly risk a shot at them from the great uncertainty of aim they would have. If the times of their appearance were well chosen, and the atmospheric conditions favorable to them, fast ships would have very little to fear from the attacks of the torpedo-boats of the mobile defense.

There is also another reason for the institution of the first two kinds of projectors; we shall see presently that with a given position of battery, observing station for mine field, launching station for torpedoes, etc., there is a certain position for the projector detailed to discover the target within the field of action covered by those works, which is distinctly preferable to any other; and since forts, observing stations, etc., have different positions and fields of action, it follows that a projector should be attached to each for exploring services. If, however, the various works of a defense are so close to each other that they may be considered as a whole, and all operate on the same zone of the sea, a single projector may be sufficient; this, however, cannot be the case with forts (which nearly always have a very extended field of action), in conjunction with groups of batteries for the defense of the obstructions, observing and launching stations, etc., which have a field of action more internal and limited, hence the necessity of having the two systems of projectors before named. Besides this, it is very certain that searching the horizon by the projectors destined for this service would have to be continued after an enemy's ship had been discovered, hence the necessity that the fort or group of forts commanding the zone in which the ship is discovered should have a projector attached exclusively to this fort or group of forts so as to keep their target constantly illuminated, and at the same time leave the work of exploration to be carried on by the projector detailed for that service. The reason which justifies the existence of these aiming projectors is as follows:

PROJECTORS FOR THE OBSTRUCTIVE DEFENSES.

Let A B (Fig. 1) represent a mine field, and C its protecting battery, with this single and well-defined duty only, G C H being the field of action which its guns command; this limitation permits of the protection of the battery from the guns of the enemy's ships in the offing by the earthwork or armored parapet D; the same advantage may be obtained in the protection of the projectors when their duties are confined solely to the surveillance of the obstructions themselves; they may therefore, for example, be installed at P, and will illuminate the zone E P F, which includes, in addition to the mine field A B, a zone Z in front of it, and such that the least distance *a b* between the external radius P E of the sector to be explored and the first line of the mine field is at least 1000 metres. In this way before the boats and light vessels could reach the mine fields and be in a position to do them injury they would be a sufficient time under the fire of the protecting battery; or, in the case of an observation mine, the officer at the

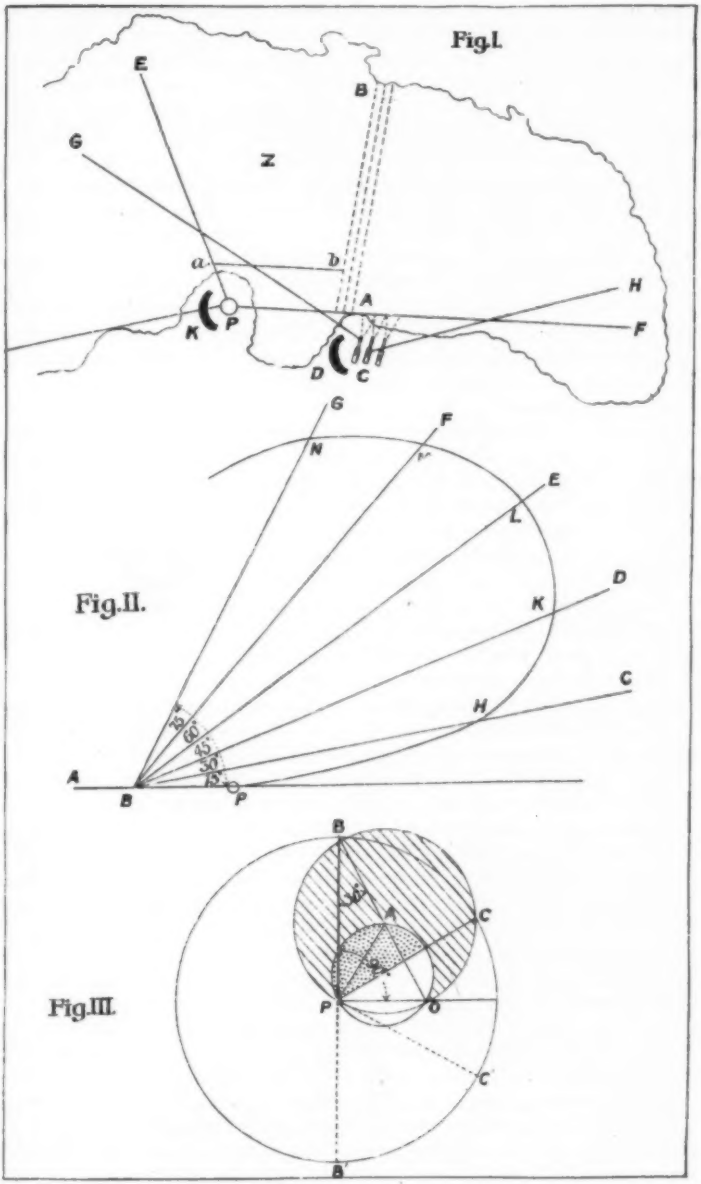


Fig.I.
E
B
G
Z
a
b
H
A
K
P
F
D
C
Fig.II.
G
F
N
E
L
D
K
C
H
75°
60°
45°
30°
15°
A
B
P
Fig.III.
B
A
C
P
O
C'
B'

observing station would have plenty of time to discover and follow the enemy's ship while she is still at some distance from the mine which it is his duty to explode. The projector would be defended by the armored parapet K from the guns of the enemy's ships in the open, and from which also by its keeping the source of light out of sight a good object of aim would be withdrawn. It might be objected that a projector so installed might be surprised by launches or torpedo-boats and destroyed, as they could approach in the sector E P L not covered by the light; for this reason an attentive and vigilant service of guard-boats and coast defense torpedo-boats would be exercised in the dark zone, and which would constitute the mobile defense outside the obstructive defenses; the steamboats not being disturbed by the electric light would perform a service of discovery really efficient, and would engage the boats of the enemy which might attempt to interfere with the obstructive defenses. A few machine-guns in the neighborhood of the projectors would defend the approaches both from the sea and shore against any enemy rash enough to attempt to take them by surprise by a night attack.

EXPLORING AND AIMING PROJECTORS.

The exploring and aiming projectors are more subject to destruction by the guns of the torpedo-boats and light ships of the enemy in virtue of their exposed position. They should therefore be protected as much as possible; they should never be so installed as to be exposed to direct attack, by which I mean to the destructive effects of projectiles falling in their immediate vicinity; they should not therefore be placed on ramparts of masonry, neither inside nor in the neighborhood of old churches, castles, towers, etc., where they would run the risk of being buried in the ruins caused by shell fire, and never so that there are walls behind and above them.

The projector should be protected by an armored parapet or other defense in such a way that the lens alone, from which the beam of light issues, remains unprotected from the shots of the enemy. An armor-shield similar to that employed for the protection of light guns moving with the projector, and provided with suitable apertures, would serve to protect it and also the operator as well. A disappearing installation would also give good results when arranged so that it allows of the projector being worked under cover, leaving only the reflecting mirror exposed. In determining the position on shore for the projectors for the defense, care should be taken that in working the light for searching purposes the beam does not fall on any of the other defensive works, as this would not only render them visible to the enemy, but would also place the gunners and every other observer in the worst possible condition for carrying out their duties. The alternation of dazzling light and almost total darkness, injurious to all, would be exceptionally so for the officers in charge of the observation mines, as they would be able to see nothing beyond their own immediate surroundings. It would be a grave error too to place a projector inside a battery, from the disturbing effect it would have on the aiming of the guns in certain positions of the beam, besides which it would afford the enemy a good target and enable them to direct their own guns on the battery. Here we might consider (although we have not much practical experience to go

upon) that the aim against a projector would always be a very certain one since the gunner, if provided with suitable colored glasses, could see and keep the sights on the source of light, even when it is turned directly against him.

CURVE OF VISIBILITY.—CHOICE OF THE LOCATION IN WHICH TO ESTABLISH THE ELECTRIC LIGHT STATION.

It does not need a long argument to show that nothing disturbs an observer more than a source of light close at hand, and which strongly illuminates the objects in his immediate vicinity when he is intent on discovering objects at a distance. For this reason a position near to the electric light projector is an unfavorable one for an observer; we can therefore assert so far that a projector should be placed at a distance from the works whose target it is its duty to illuminate; but on what bearing? Let P, Fig. 2, be the electric light projector, PA the direction of its beam, and let us make PA fall on any target whatever, keeping the axis of the illuminating cone constantly on it; for example, at B; an observer situated at P, near to the projector, would then lose sight of the target; let the same observer, starting from B, take the various directions BC, BD, BE, BF, BG, etc., making with PB the angles PBC = 15°, PBD = 30°, PBE = 45°, PBF = 60°, PBG = 75°, etc., and determine the different points H, K, L, M, N, etc., at which he loses sight of the target; by joining these different points we shall obtain a curve which we may call the curve of visibility. We shall find that the curve KLM approximates very closely to an arc of a circle having its centre at B, and the radius BK = BL = BM equal to about six times PB, the distance between the projector and the target. This is the only experiment as regard the researches for data in the employment of the electric light which has a general character; the results always verify each other under any atmospheric conditions, and independently of the observer or of the material employed; the only condition necessary is that all the other conditions remain constant during the period of the experiment. From this we may draw the conclusion that the most advantageous position for an observer with respect to a target illuminated by the electric light is such that the line drawn from his position to the target makes an angle of from 30° to 60° with the beam of the projector. It is not to be concluded that to maintain this favorable position will necessitate a considerable limitation of the zone of exploration. For example, let us construct (in Fig. 3) a right angle triangle at PBPO, the base PB = 3500 metres (the maximum range of exploration), the angle PBO = 30°, and let us suppose the projector at P, the target at B, and the observer at O; describe a circle passing through the three points, P, B, O; it will have its centre at A, the middle point of the hypothenuse BO, and PAO, will be = 60°. Let us describe a second circle through P, A, O; now, for all the points comprised within the figure in hatched lines, the straight lines from them to P and O will form angles varying from 30° to 60°; for those comprised within the figure in dotted lines the above conditions will not hold good, but when we consider that their greater proximity to the projector will more than compensate for the unfavorable conditions in which they are placed, we shall see at

once that they may also be included in the sector of exploration, which will result in this sector BPC being equal to 60°; which is sufficient as we shall see hereafter in considering other conditions which limit its extent to a range not greater than this; the positions of the observer and projector being fixed we shall have another sector B'PC' similar to the first. It is very certain that the reasons for deciding the choice of position for an electric light installation will be so many and various that we shall be obliged to take only a relative account of all that we have brought forward. In order to fix the position of the projector for any defensive work it is necessary to determine its range, to do which would require numerous and difficult experiments, and in carrying them out we should have to take account of most variable conditions, and which it would not be possible to include in our calculations by the substitution of any coefficient whatever, as, for example, the state of the sea and atmosphere, the height of the projector above the sea level, the nature and color of the target, and the manner in which it is presented, etc. We may say, therefore, that the projector has no fixed range, as any of the above causes would be sufficient to modify it; besides which, as we see on the first experiment of which we treated, the position of the observer influences the effective range of the projector; it is clear, then, that in this particular it is impossible to obtain data of a precise and general character, but if we had the results of numerous and patient researches to guide us, we might be able to deduce from them consequences of the greatest advantage to us. I maintain, in conclusion, that it is absolutely useless to extend observations beyond a range of 3500 metres for projectors of 90 cm. (36 in.) and 70 amperes, which are the prototype of those used for coast defense. The rapidity with which the efficiency of the projector diminishes with increased distance from the object it illuminates is well known, and must be taken into account when choosing the site for the installation of a search light installation; we cannot, therefore, think of placing the observer nearer to the target than the projector is; which principle applies also to the defensive works.

Both the projectors for the protection of the obstructions and those for discovering the enemy's ships must be situated at the least possible elevation above the sea; for whilst it is of the greatest advantage on the one hand to preserve the inclination of the beam to the horizon constant, yet, on the other, it is obviously desirable to leave the dark zone near the coast immediately under the beam as small as possible in extent, and it is therefore clear that the lowest elevation is the best; in practice, however, we must adopt a position which protects the projector from the wash of the sea or spray during bad weather. For projectors which serve to illuminate the targets for the heavy artillery the same conditions do not hold as for the others, and for them the greatest elevation possible is to be preferred. The intersection of the beam and the ship illuminated will, in this way, result in a larger area of illumination, and it will increase with the increase of the angle of incidence and with the increase of elevation of the projector; more than this we shall have in the projection of the beam the illuminated surface of the upper deck of the ship, which is generally light in color, and will increase the visibility of the target from the batteries.

METHODS OF USING PROJECTORS FOR COAST DEFENSE PURPOSES.

The greatest uncertainty still exists amongst the most competent judges on the employment and arrangement of projectors for harbor defense, but from what we have stated in this article, one thing is clearly manifest, and that is, that any method of using a projector would be preferable to that which leaves it in the hands of the person who operates the working apparatus, that is, who is placed in the immediate vicinity of the source of light; to this, however, we are forced to submit when the projector is not in communication with an observer conveniently situated. An ideal arrangement would be that which would permit the observer himself to work the apparatus when placed at a distance from it, but in default of this we must have recourse to the telegraph or telephone, as it is evident that instantaneous transmission is required in order to control a projector efficiently from a distance; the telegraph is, therefore, advisable only as a safe method of communication and which leaves a register of itself, but it does not answer the conditions. There is no doubt but that the telephone must be adopted; the receiver must be situated in a quiet place so as to avoid repetitions, which would cause a loss of time and make the connection itself useless. Close to every electric light station there should be a chamber, which should also serve as the storage room for the projector, in which all the telephonic communications should be collected; the attendant receiving the messages at the telephone should transmit the orders to the person in charge of the training and elevating gear at the projector, either by calling them out loudly, or by means of a voice tube; in the same chamber there should be an observer for the illuminated zone, to assist the one stationed at a distance in giving instructions to the man working the projector. The principal services which may be assigned to a projector are the following:—1st. To discover a ship within a given section of the horizon. 2d. To follow the target with the beam of light. The best way to use a projector for the purpose of discovery is undoubtedly that in which a fixed depression calculated as a fraction of its height is given to the beam of light, and such that the inclination of the illuminating cone with the surface of the sea will produce an illuminated ellipse with its major axis in the line of the beam equal to 4000 metres, and the projector should be worked with a uniform angular movement. The velocity of this movement should be such as to cause it to pass twice over any ship which might cross the zone commanded by the projector, in the direction of a chord of the sector, at a speed of 18 knots. If the extent of the sector is so great as to necessitate a too rapid angular movement of the projector, it should be divided between two, and for this reason as a rule the extent of the sector assigned to any single projector should not exceed 60°.

To follow an object when discovered with the projector does not offer any difficulty when the observer and the person working the apparatus is one and the same individual, but when this is not the case the operation becomes an exceedingly delicate one, and it is a bad case if there are two or more observers watching the target, and giving instructions to the man in charge of the light; there should be perfect accord between the observer and the latter, who should know exactly what is meant by the orders "easy,"

"smartly," etc., which necessitates constant exercise with a fixed personnel.

It is certain that a really efficient employment of projectors can only be obtained by having them controllable at a distance. Another important question arises, Should the projectors for harbor defenses be kept continuously in action during the night? Admitting that the position of the electric light installations is perfectly known to the enemy, the continuous action of the projectors will carry with it the following disadvantages:

1st. It will allow the enemy to reconnoitre from the offing every locality and prominent point, to determine his exact position on the chart, and as a consequence the exact distance of the various defensive works.

2. Friendly guard-boats, torpedo-boats, and small vessels will be frequently under the light of the projectors, and whilst it would render their task of attack by surprise most difficult, it must often happen that they will form a most favorable illuminated target for the guns of the enemy's ships and which they, surrounded with light, will not even be able to see; in other words, the movable defense would be obliged to carry out its duties under conditions absolutely unfavorable; when the particular local conditions do not admit of this danger being avoided, I think we need not hesitate to affirm that the projectors should not be kept continuously in action, but kept instantly ready for use when the presence of the enemy is notified by the exploring ships or guard-boats.

In addition to keeping the projectors obscured, when we can also succeed in suppressing every light visible within a certain distance, such as from houses, lighthouses, factories, etc., on dark and rainy nights, which are just those in which isolated and limited attacks by surprise are most to be feared, we shall render the enemy uncertain and hesitating in his attack, and enable the boats of the mobile defense to operate under more favorable conditions. It may be objected that this obscurity will also be injurious to the ships of your own side in case it should be necessary for them to enter the protected harbor, but it must be admitted that their commanders will be more familiar with the locality than those of the enemy's ships; besides which it would be easy to establish a temporary light in a convenient position, which should only be shown when a ship, known to be friendly by means of private signals, requires to enter the harbor. The ships and torpedo-boats of the exploring service should be furnished with a 40-cm. (15¾-in.) projector, ready for action but completely obscured, so that when the beam is thrown on the ship or boat discovered, it not only announces the fact of the discovery, but also the direction and nature of it. In order not to expose herself to certain and swift destruction, the light should be obscured every now and then, and a rapid change of position effected before again putting it in action; the ship could in this way be fought efficiently by the other torpedo-boats which would operate under cover of darkness; and if she should take to her heels again this will be the time to put into action the projector of the fixed defense, in order to show her up for attack by the batteries to which they are attached. The launches and guard-boats in the zone outside the obstructions should also be supplied with 35-cm. (13.8-in.) projectors, which they could use as above for discovering the

enemy's torpedo-boats and small vessels which may invade their territory. In conclusion, I consider that accurate study and patient research and experiment are still necessary on the subject of the installation and employment of projectors, and am convinced that the conclusions arrived at would show that greater confidence should be placed in them, and that it is necessary to employ them much more largely than at present for the purposes of coast defense. It is certainly necessary to dispel all that is at present indeterminate and uncertain in the use of this particular arm of the service, which, seeing that it always and continuously reveals its presence at the same time as its efficiency, may easily become dangerous rather than useful to its friends.

STUDIES IN TROOP-LEADING.

By General von Verdy du Vernois,

(*Sometime German Minister of War.*)

By Lieut. Col. G. F. R. HENDERSON, Staff College, England.

From the United Service Magazine, London.

IN face of the high standard of training, discipline, and organization which is common to the European armies of to-day, it is difficult indeed to predict the issue of the next great conflict. We may believe that Germany still maintains her preëminence, and it is certain that she would begin a new series of campaigns supported by the *prestige* of these successful wars; but for all that, "her enemies are not the old enemies," and none are more ready than German soldiers to admit the extraordinary progress of other nations in all that pertains to war. The superiority of the Imperial army is no longer unquestioned, and even its warmest admirers allow that the appearance of a great general on the other side might be sufficient to turn the scale.

The Krieg's Akademie at Berlin has long been a manufactory of capable leaders. But its methods have been imitated elsewhere, and it is very possible that in the event of war Germany will find that she has lost the monopoly which seems to have been hers during the latter half of the nineteenth century. Still, the work of training men to command and responsibility goes on unceasingly, and General von Verdy's pages show us what a many-sided work this training is. Like his former volumes, the one under review goes into minute detail whenever a situation is discussed. Precautions which seem absolutely elementary, which not only find a prominent place in every text-book, but are so simple that it would appear impossible for any man of ordinary common sense—much less of military knowledge—to neglect them, are insisted on with a persistency which seems unnecessary. The most rudimentary principles of tactics are repeated again and again. Details of service, which the ordinary soldier would imagine were carried out on a campaign as a matter of course, are discussed as if they were grand strate-

gical conceptions, and the greater part of the book before us is concerned with matters with which the last-joined subaltern is familiar. For example, several pages are devoted to impressing on the mind of the student that to get reliable information it is necessary to take up and to maintain touch with the enemy, whilst the general inaccuracy of intelligence obtained from civilians is commented on and exemplified in several distinct chapters.

Now to those in search of new and original ideas on the art of the higher leading of troops, on the probable effect of magazine fire and shrapnel shell, and the many problems of future warfare, such prolix treatment of well-worn themes is unattractive. The constant reiteration of text-book platitudes repels them, and the spectacle of one of the first amongst military writers condescending to details with which only novices are concerned induces astonishment and nothing more. Nevertheless, I venture to think that such careful analysis of elementary tactics is the outcome of a wide practical experience both of war and of human nature, and indicates a deep appreciation of truths that are not always grasped, first, that "in war everything is simple, but the simple is difficult"; secondly, thal a thorough knowledge of detail is even more necessary than an acquaintance with general principles; and thirdly, that, putting aside the factor of skilled generalship, under present conditions of almost equal training, discipline, and organization, the army to which details are so familiar that they are never overlooked will have the best chance of success.

It has been said that a mastery of details is the mark of genius; and, however this may be, it is certain that punctilious attention to them is the mark of efficiency. It is for these reasons, I believe, that in his most valuable series of studies in troop leading, published at intervals since 1870, of which the present volume is the latest phase, the great German tactician has laid so much stress on common-place duties and common-sense precautions, and has impressed upon his readers the value of methodical attention to minor details. He appears, in every one of his volumes, to have had in view the creation of a habit of incessant vigilance, and of an unwavering regard for those ordinary rules of war, which, however well-known they may be, are apt to be neglected unless knowledge has solidified into instinct.

It is in this form that theoretical instruction is of the greatest practical value. We are not presented with a series of essays upon tactics, of disquisitions, fortified by numerous examples, on stratagems and formations. These may interest for the moment; and may even afford suggestions to those engaged in the work of instruction and in the compilation of drill-books. But they do very little to exercise the judgment, and their teaching is seldom so vividly impressed upon the memory as to find expression in practice.

It cannot be too frequently repeated that men act in the field, when face to face with the enemy, on habit and on instinct. These are not created by studying tactical treatises, nor indeed by any kind of theoretical study whatever. But General von Verdy's methods, if they are followed out with map and compass in hand, and are closely studied, not merely

skimmed, will establish a fund of knowledge which cannot fail to be most useful.

Without such knowledge, even practical experience loses half its value. Experience without reflection is of little benefit. If a man has at his command a fund of knowledge; if he has closely studied actual tactical situations, has noted the mistakes made, and learned the way in which they might have been rectified; if he has some standard with which to compare his own handling of such situations before the enemy, he will readily detect his own shortcomings, recognize the manner in which he ought to have acted, and learn lessons from campaigning which would certainly escape the ignorant and the unreflecting.

In General von Verdy's studies we are at once immersed in a sea of details. The difficulty of carrying out the most elementary principles is so insisted on that we come at last to view them in their true light—*i. e.*, as the basis on which success rests; and we acquire the habit of making them our first thought whenever we are confronted with any tactical problem whatsoever. In short, we realize the importance of details; and when we come to the next steps in our military education, the exercises of the war-game and the manœuvre-ground, we find that the catalogue of precautions is so impressed upon our minds that if we do not always apply them in practice, we at least remember, sooner or later, that we neglected them, and the next occasion will find us more alert.

It is perfectly true that tactical studies, drawn from books alone, will never of themselves make a competent leader of men. But it is just as certain that any officer whatever, even if he possess every quality which goes to make a successful soldier, will improve his natural capacity by following General von Verdy's methods. History, and military history, with its long catalogue of errors and mishaps, goes far to prove that those who can afford to dispense with theoretical instruction are few in the extreme.

In the present volume seven different situations, all of them in existence between the 15th of July and the 2d of August, 1870, are represented and discussed. The first concerns the garrison of Nier, and deals with the method of holding a river, at a short distance from the frontier, with a view of covering the districts in rear.

The second has to do with Saarlouis, a small but strong fortess, in close proximity to hostile territory.

The third, perhaps the most interesting of the series, has for its text the occupation of Saarbrucken, and the security of an open town in the immediate vicinity of the enemy's masses.

The fourth, relating to the western quarter of the Bavarian Palatinate, deals with the security of the frontier in a mountainous district.

The fifth, relating to the eastern quarter of the same province, involves the security of the zone of concentration for a field army.

The sixth carries us to the right bank of the Rhine and the northern quarter of the Grand Duchy of Baden, where the garrisons, leaving a portion of the district unwatched, concentrated with a view to combined operations.

The southern quarter of the Grand Duchy was the scene of the seventh,

and here the security of the district was maintained by means of "a flying column."

Now, although it is more than probable that such situations as these will never again present themselves under conditions exactly similar to those of 1870, it is nevertheless apparent that the examination of these seven distinct instances will leave little to be learned as to the difficulties inherent to the defense of a frontier in the near presence of the enemy. Moreover, the duties of reconnaissance of the outposts are very fully dealt with, and the lessons deduced from the action or inaction of the German and French commanders—of every grade—are applicable to almost every possible situation with which patrols and pickets are concerned. The studies are therefore of value to all officers, of whatever rank, and not merely to the leaders of large units alone. It is impossible to give even in brief the author's summing-up of the work done by the detachments on the frontier line, but certain remarks as to cavalry reconnaissance, which have an historical as well as a technical interest, are well worth paraphrasing.

It is the general impression that in the campaign of 1870 the French did nothing whatever in the way of reconnaissance; that the cavalry were invariably kept behind the infantry; and, on the other hand, that from the outset the German horsemen were as audacious as ubiquitous. The foundations for this popular belief collapse altogether when exposed to General von Verdy's researches. His detailed account of the operations on the frontier not only shows that the French showed a great deal of activity in front of their positions, but makes it very evident that their adversaries displayed very little of the extraordinary enterprise with which they have been credited. The French system of patrolling was a clumsy one. The exploring parties were strong; they were generally composed of both infantry and cavalry, and were even accompanied on occasions by detachments of engineers. The Germans, on the contrary, employed small patrols, ranging from a company to a squad, from a squadron to an officer or two and three or four troopers, and very seldom did the two arms combine, except when a few mounted orderlies were attached to the infantry.

But on both sides patrolling was incessant; and on both sides it appears that either injudicious or misinterpreted orders reduced the whole business of reconnaissance to very timid "sparring." The French were at first ordered to reconnoitre "as far as the frontier." When this method failed to bring in intelligence, instructions were issued to the effect that the troops should not fear to cross the boundary, but that "they should be careful not to compromise any important detachment." The result of these limitations was that Napoleon's headquarters were absolutely ignorant, from the 19th July to the 2d August, of the number of hostile troops behind the Saar. They were unaware that the frontier stream was held only by a slender line, and that the district in rear, as far as the Rhine, was practically unoccupied.

During the same period, at Saarbrucken itself and in the Palatinate, the stress laid by the German authorities on the observance of a defensive attitude, and in the care of one important detachment of watching the frontier, checked the initiative of their cavalry commanders. It was not until a

regiment of hussars was sent to the front with explicit directions to obtain information that patrols, except in a few isolated instances, were sent out with the express object of taking up contact with the enemy and discovering his movements. Up to that time the scouting parties contented themselves with getting reports from the country people, and retired without further effort when confronted by the custom-house officials and gendarmerie. The weakness of the cavalry all along the line had perhaps something to do with this want of resolution. But the fact appears inexplicable when we read of the extraordinary success which attended the energy and daring of a few enterprising officers.

At the same time the efficiency of the German headquarters' staff, their knowledge of the composition of the French Corps d'Armée, and the valuable information transmitted by civilian officials, foresters, and others posted on the frontier, afforded Von Moltke a means of probing his opponents' dispositions and intentions, and of turning to the best account the scraps of intelligence obtained by the patrols.

The French learned nothing. They were ignorant of every detail of intelligence duties.

We may remark, in connection with the question of mounted infantry, which I reverted to in a review of General von Verdy's first volume in the November number of the *Magazine*, the constant addition to the German cavalry patrols of infantry in carts.

If further criticism than that expressed by the author be permitted, it would seem that, so far as regards reconnaissance, even the Germans appear to have been tied down to stereotyped modes of procedure. It is true that the general spread of military knowledge, in a nation of conscripts, made the reports of civilians, official and otherwise, as full and exact as possible; but, so far as soldiers were concerned, an over-scrupulous regard for text-book rules was everywhere apparent. The methods of procuring intelligence, as laid down in the regulations, were considered sufficient. No one felt called upon to use his own intelligence to evolve other means. It is curious that the French, proverbially quick-witted and resourceful, acted even more mechanically. Were the intellects of their officers so blunted by routine that they refused to work out of the accustomed groove; or, while training them to subordination, had the authorities forgotten the necessity of fostering their capacity for independent judgment and individual resolve.

Wellington's method of utilizing well-mounted officers as scouts was never imitated. In a thickly wooded country like the frontier region they would have found many opportunities. Of course, the difference of language and the hostile population would have made the task more difficult than those that were so successfully carried through by Waters and Colquhoun Grant, of Peninsular fame, and by both Federals and Confederates in the Secession War. But it may be questioned whether either Englishmen or Americans would have been content with the meagre information obtained by the German cavalry patrols. There were many daring rides of solitary horsemen in the Mutiny, where something worse than capture was the fate of the unlucky; and in the Mexican War of 1847-48, a young officer

of Engineers, destined to take rank amongst the greatest captains of the world, laid the foundation of his renown by enterprises such as these. In Long's "Life of Lee" are recorded several instances of reconnaissances, carried out by the future Confederate general, which were the immediate cause of the remarkable victories of the American army.

I will conclude with a hope that these volumes will not be overlooked by English military students, and also that before long they will make their appearance in an English guise.*

The graphic picture of the mishaps that may be made by well-trained troops; of the way in which the movements of important masses of troops may pass unobserved; of the constant alarms, and useless concentrations, based on false information; of the uncertainty which must exist even at the best-informed headquarters; of the necessity of weighing every item of intelligence with the utmost care; and of the coolness and discrimination needed by those officers who hold command in rear of the outpost line, with all its excitement and wild rumors, is worth the most careful consideration. It is an object lesson in generalship of the very highest value; and both to those who obtain information, those who transmit it, those who sift it, and those who receive it and have to base their plans upon it, this "Study in Troop-leading" is an admirable text-book.

I may add that a third part, dealing with the engagement at Saarbrucken on 2d August involving a variety of tactical details, discussed with as much thoroughness as the preceding volumes, has already been published. This work I propose to notice at a future time.

SYMPATHETIC EXPLOSIONS.

By C. A. MITCHELL, B.A. Oxon.

From Knowledge.

IN an explosion we have the sudden evolution of large quantities of gas which meet with external resistance. Thus, in the case of dynamite, the substance is suddenly decomposed into gases, which meet with the resistance offered by the surface of the earth on the one side and with that opposed by the weight of the atmosphere on the other.

Explosive agents are roughly classified as "high" and "low" explosives, the former term being usually applied to those exploded by detonators and used as destructive agents rather than for the propulsion of projectiles. Nitroglycerine and gunpowder may be taken as representatives of the two classes.

Substances liable to explosion are, as it were, in a state of unstable equilibrium, and often a slight cause is sufficient to so disturb that equilibrium that a fresh arrangement of the particles takes place—in other words, an

* An admirable French translation, by Captain Monet, of the General Staff, has been issued by Westhausser, 10, Rue de L'Abbaye, Paris.

explosion. A somewhat analogous instance of instability is to be noticed in the case of water cooled slowly below its freezing point without solidifying, as occasionally happens in bedroom jugs. When the jug is lifted the movement destroys the equilibrium and the water suddenly becomes ice. Prince Rupert's drops illustrate the same phenomenon. These are small pear-shaped globules prepared by allowing molten glass to fall from a short distance into cold water, which causes the exterior to cool more rapidly than the interior, and the mass is left in such a state of tension that, if the extreme tip of the drop be broken off with pliers, the whole flies to powder.

Explosive bodies differ very considerably in stability. The so-called iodide of nitrogen, a black powder formed by digesting iodine in a solution of ammonia, explodes when dry with the slightest touch. Nitroglycerine is more stable and requires the blow of a hammer for its explosion. This substance is prepared by allowing strong nitric and sulphuric acids to act upon glycerine, care being taken to keep the temperature low. It is an oily liquid, and is very poisonous. As an explosive it is uncertain, and has been the cause of many accidents. When mixed, however, with an inert substance, such as sawdust, it is much more stable. This is the principle made use of in the manufacture of dynamite, which consists of nitroglycerine absorbed by a porous siliceous earth called kieselguhr.

Dynamite is very stable under ordinary conditions, as was well shown in the experiments carried out in the Lauenburg Fabrik in 1876.* A barrel containing 540 kilograms † was dropped a distance of 20 feet on to a paved road, and in a second experiment a weight of 10 kilograms was dropped on to a dynamite cartridge. In neither instance was there any explosion. The dynamite used burned quietly when thrown on a fire, but exploded powerfully even on an open surface when a detonating cartridge was exploded in contact with it. We have thus the curious phenomenon of a substance which burns quietly and withstands a heavy blow, but which disintegrates readily when another less stable body is exploded beside it. This is explained by the theory of an explosive wave which is communicated from the one explosive to the other. Where an explosive burns quietly there is much slower decomposition, and the particles first taking fire radiate their heat too quickly for the entire mass to be simultaneously raised to the temperature of explosion. If the heat cannot be dissipated sufficiently fast, as in the case of confined gun-cotton, an explosion follows just as when a detonator is used. Thus the unstable equilibrium may be disturbed either by heat or by communication of a mechanical vibration. This latter method of sympathetic explosion, as it has been termed, is now very generally used to effect explosion of charges of dynamite and gun-cotton.

That the deflagration of one substance can produce a sympathetic explosion at a distance has been illustrated by many accidents. The explosion of a quantity of nitroglycerine in one shed has often caused the explosion of other materials some distance away. A remarkable instance occurred in 1888, in a factory at Wandsworth, where the caps for toy pistols were made. It was believed that the explosion was owing to one of these amorces, con-

* Ber. Deut Chem. Ges., IX., 1802.

†A kilogram = 2.2 lb.

taining more than the regulation amount of composition, having been cut with scissors, and thus causing all the rest to explode. The shed was wrecked, and three girls lost their lives. A similar case happened in France, where a child was killed by cutting open a cap, which caused two large packets to explode.

When an explosion is communicated from one cartridge to another, there is a gradually weakening effect. This was proved experimentally in 1872, by Captain Muntz, at Versailles. The explosion of the first charge excavated a funnel-shaped hole in the ground measuring 0.9 metre* in diameter. The shock caused a second similar cartridge placed at some distance to explode. But in this case the diameter of the hole excavated was only 0.66 metre.

Captain Colville found that there was a definite relation between the weight of the charge used and the distance between the cartridges. A charge weighing one kilogram and containing 75 per cent. of dynamite, communicated its explosion on hard ground 0.3 metre. Where D represents the distance in metres, and C the weight of the charge in kilograms, he showed that under these conditions $D=3C$. When the cartridges were laid on a rail, the distance to which the explosion could be communicated was increased, and $D=7C$. On the other hand on soft or plowed earth, the distances were much less.

To explain this property of explosives, Sir Frederick Abel advanced the attractive theory of a sympathetic rhythmic vibration between the substance detonating and that detonated, analogous to the synchronous vibrations set up by sound waves. A certain note of a piano will often cause a glass to jingle, and if the glass be made to emit its note, it will be found to be the same as the note of the piano—that is each vibrates at the same rate. Sir Frederick Abel thus expresses his theory: "Vibrations produced by particular explosions, if synchronous with those which would result from the explosion of a neighboring substance, will, by their tendency to develop those vibrations, either determine the explosion of that substance or at any rate greatly aid the disturbing effect of mechanical force suddenly applied."

Facts in support of this are that sometimes a feeble detonation will determine an explosion when a more violent one will not. Thus iodide of nitrogen will not cause compressed gun-cotton to explode, nor does nitroglycerine cause the explosion of gun-cotton in sheets on which is placed the case of nitroglycerine.

The interesting experiments of Champion and Pellet† tend, perhaps, to confirm this.

1. A very small quantity of iodide of nitrogen, detonated at one end of a long narrow tube, caused the explosion of a similar quantity of the same substance placed at the other end of the tube at a distance of seven metres. That the transmitted concussion was slight was shown by the insertion of a light pith ball in the middle of the tube.

2. Damp iodide of nitrogen was fixed to the strings of a bass viol. When it was dry the strings of a similar instrument were made to vibrate at

* A metre = 39.3 inches.

† *Comptes Rendus*, LXXV.

a distance. A detonation occurred only when a note giving sixty vibrations per second was sounded. The G cord caused an explosion, while the E cord did not. The vibrations produced by metal plates acted in the same manner as strings.

From these results the observers came to the conclusion that explosion was due to vibratory motion independent of heat and shock.

This theory has not met with general acceptance.

Eissler* is strongly opposed to it. He urges that all the experiments of Champion and Pellet may be explained by taking into account the vibrations of the supports and the resulting friction. Moreover, the characteristic feature of a given note has never been established, but only the fact that below a certain rate of vibration the explosive effect ceases. He explains the facts by the supposition of two orders of waves, one explosive and the other purely mechanical.

In substantial agreement with him, Berthelot† also objects to the theory of sympathetic vibrations. He proves that the chemical stability of matter is unaltered by merely sonorous vibrations, even when the substances experimented on are as unstable as ozone, which is so readily changed into oxygen. Therefore, according to him sonorous waves cannot be the real agents in chemical decomposition and explosion. His explanation is that "explosive matter detonates, not because it transmits the vibratory energy by vibrating in unison, but, on the contrary, because it stops it and appropriates the energy." With reference to Abel's experiments, he argues that if gun-cotton can explode nitroglycerine, why cannot nitroglycerine explode gun-cotton, assuming that the two compounds vibrate in sympathy; whereas this transformation of energy into work may be readily explained by a difference in constitution.

The same chemist made a large number of experiments to determine the velocity of the explosive wave in the case of different explosives.‡ Long, narrow tubes, made of lead, tin, or Britannia metal were used, and the rate of propagation of disturbance through the tube measured. He found this to depend on: (1) The diameter of the tube; (2) the density of the explosive; (3) the resistance of the material in the tube. The explosive wave from compressed gun-cotton had a mean velocity of 5200 metres per second in lead tubes, and of 6000 metres per second in tin tubes. Liquid nitroglycerine gave results varying from 1078 to 1386 metres per second; while dynamite had a mean rate of 2543 metres per second. It was found a matter of great difficulty to detonate the nitroglycerine in such narrow tubes. A curious feature was, that whether the tubes were curved or straight, the results obtained were substantially the same.

* Modern High Explosives.

† "Les Matieres Explosives."

‡ *Comptes Rendus*, 100, 314–320.

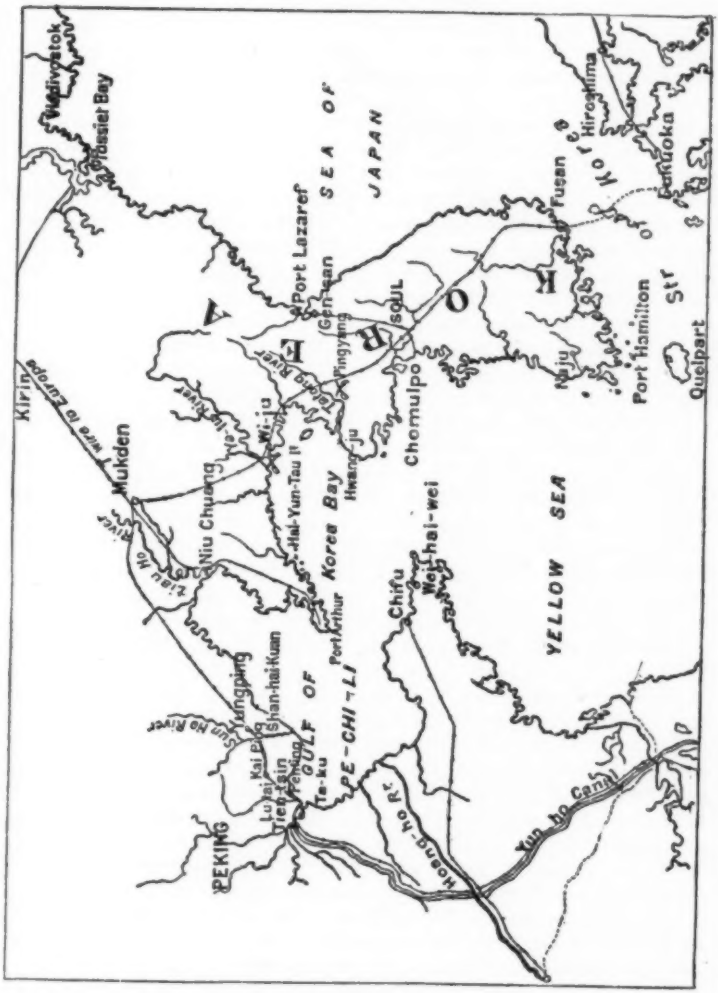
THE WAR BETWEEN CHINA AND JAPAN.

(*From the Army and Navy Gazette.*)

MOVEMENTS OF THE TROOPS.

FOR nearly a month there has been something like a cessation of hostilities between the two principal parties to the quarrel, although by all accounts the Japanese have had their work cut out to pacify their friends the Koreans. Indeed, some of the telegrams this week (Oct. 20) state with much show of probability that the Tong-Hak uprising is taxing the whole strength of the invaders to control. The newspapers from the far east, and private letters received in this country, although they are of dates only just subsequent to the battles of Ping-Yang and the Yalu, are full of statements about the guerrilla warfare carried on by the Koreans in the south of the peninsula. Cutting telegraph wires, looting provision convoys and worrying forage parties and outlying pickets and detachments, appear to be the tactics of these bodies, and doubtless has contributed to delay the advance of Gen. Nodzu's army advancing northwards.

The Japanese advanced guard only reached the southern banks of the Yalu on Oct. 8, and the headquarters of the army are still at Söul. Possibly since the 8th the troops at Wi-Ju may have been reinforced, for on the 15th we were told that the two armies were face to face on the river, and that Count Yamagata was waiting for his heavier artillery and supplies before attacking. It was also rumored in the camp that Japanese warships would assist in the attack on the Chinese position. But so far all the information as to what the Chinese are doing on the north bank of the Yalu comes from Japanese sources. They are said to be 25,000 strong, to have several batteries of artillery on the river front, and to be working day and night at the improvement of the natural advantages of their position. Of course, if the Chinese are actually doing what their enemies say they are, they should be in a very strong position indeed. They have had a month to entrench themselves, to arrange their plans of defense, to take advantage of the natural strength of the place, and to bring up troops and to supply themselves with arms, ammunition and other supplies. It is well known that the Chinese fight well behind fortifications, and they may therefore be expected to offer a resistance which may make their position a rival to Plevna. But then the same telegram which speaks of these preparations also tells us that the Chinese are expected to make their chief stand at Kubenchao. This place is not marked on the maps, but it may be intended for Chu-Lieu-Cheng (Kiu-Lien-Tcheng), which is 30 miles to the west of the river and 120 from Moukden. To this place it was that, according to Chinese accounts, their main body withdrew after the battle of the Yalu, leaving a rear guard only at Wi-Ju; and the *Times* correspondent at Tientsin stated on Oct. 17 that their headquarters were still there. If it be true that the Chinese generals are about to repeat their previous tactics, and to retreat from the Yalu as they did from Ping-Yang, we may find the Japanese repeating theirs also, and in that case a brush with the rear guard will be magnified once more into a decisive victory. If, however, the victory is to



MAP OF SEAT OF WAR IN CHINA.

be decisive, the vanquished must not be allowed another month to recuperate, but the invaders must push on to Moukden, or whatever place they intend to make their objective. This leads us to consider whether it would be expedient for the Japanese, providing they smash up such defenses as are now before them, to promptly follow up the success by an advance into the enemy's country. The difficulties of transport and supply will assuredly increase as they move forward, and winter setting in, it will intensify the natural obstacles to progress. It is not even as if they could make the estuary of the Yalu their base of operations, for ice will close the river in a few weeks now and oblige everything to be brought to the front along the road from Ping Yang, in advancing over which the difficulties of movement have already been demonstrated in an unmistakable fashion. These facts and the circumstances that between the Yalu and Moukden the Chinese may have not one but two armies, and that at the latter place such field artillery as can be carried forward may not be sufficient against the fortifications, inclines us to the belief that the Japanese will be well advised not to attempt a winter campaign in Manchuria. So far as the Korea is concerned it will suit their book far better to strengthen their position and to consolidate their hold on the country, of which they are practically in possession, by administrative reform. It is probably with this purpose in view that Count Inouye, the Japanese minister of the interior, an able administrator and statesman, has been sent to Chemulpo.

The advanced Japanese force which occupied Yong-Chow on Oct. 4, and Wi-Ju on Oct. 8, made its first move across the Yalu on Oct. 24 when a force of 1500 men pushed over the river at a place called Sukochin, some miles to the northward of Fung-Hwang-Ting, the frontier post facing Wi-Ju. This force was ferried across, and its passage does not seem to have been disputed, although the Chinese had thrown up an earthwork on the northern bank and had a couple of field-pieces mounted there.

Without waiting for daybreak Gen. Nodzu commenced the transport of his main body across the Yalu on Wednesday evening. The work proceeded throughout the night, and by daybreak the whole force—guns, horses, and men—had crossed without mishap of any kind. Meantime Col. Sato, who had taken a flying column this morning on a reconnoitring expedition, came upon the enemy fortified near the village of Fushang, on the right bank of the river. Col. Sato, although unprovided with artillery, opened an attack upon the Chinese, the fight lasting from 10 in the morning until past noon. The Chinese held their ground, and the fight was stubborn, but ultimately they were driven out of their entrenchments, and fell back in disorder upon Ku-Lien-Chas [Chen-Lien-Cheng].

The place was rushed, the defenders losing 20 killed and wounded, but further advance was barred by the appearance of a body of Manchurian cavalry, who covered the retreat of the garrison of the fort.

The Japanese forces demolished the fort, and then, in accordance with instructions, rejoined the main body. Two hundred dead Chinamen were found in the fort. The number of their wounded is unknown. A captured Chinese officer states that the position was held by 18 battalions. The force largely outnumbered the Japanese column, and retired fighting when

pressed. The Japanese loss was five officers and 90 men killed and wounded. All Marshal Yamagata's plans are completed for the coming engagement. The several columns acting in concert will deliver a simultaneous attack upon the Chinese position upon all sides. Already the network is being drawn round the Chinamen. It is anticipated that the attack will be made at daybreak on Saturday, but possibly earlier. Our latest information is that the Chinese outposts are falling back upon Ku-Lien-Chas [Chen-Lien-Cheng]. The batteries there have been increased to 11, but it is doubtful whether they are fully armed. The weather is favorable, the health and spirits of the men are excellent.

At this point the main body of Gen. Nodzu's army is reported to be now crossing, and we are informed that the main attack on the Chinese position will be delivered before Sunday. The circumstance that the Japanese have crossed the river may be taken as indicating either that Gen. Nodzu feels himself justified in pressing on because the Chinese are not in strength at this point, or that the authorities at Hiroshima believe that there is need for a forward movement of some kind to satisfy public opinion at home. For one reason or the other an invasion of Manchuria has taken place, and it may be that before this paper is in the hands of its readers a battle with the rear guard may have taken place. It seems a little uncertain what force China has hereabouts. No doubt at Chen-Lien-Cheng, Gen. Sung's headquarters, 50 miles to the northwest, there is a great army, but it is quite possible that on the Yalu the batteries are manned by a small detachment. It appears to be the Chinese tactics to still further entice the Japanese from their base, and if it be true that the Japanese land communications are already threatened by the Koreans, the policy may in a short time serve its purpose. When the Japanese forces spread out from Söul to some point in Manchuria—a long, thin line, exposed to flank attacks and raids along its whole length by guerrillas during the winter months—a reverse anywhere may be followed by wholesale disaster. As to the sea, in November the Korean Gulf is filled with ice, and the Japanese fleet, even if it is in a fit state to do so, will be unable to help.

Since this time last week the position in the far east has developed with startling rapidity considering the long period of inaction which elapsed after the previous battles.

That the Japanese have invaded Manchuria at one, if not two, points seems to be unquestionable. On Oct. 24 the advanced guard of the army under Gens. Nodzu and Yamagata pushed across the Yalu at a point some 10 miles above where the Chinese had erected batteries facing the river. Under cover of the night Col. Sato (or, by some accounts, Col. Tsuchiga) crossed at a ford near the village of Suko-Chin, and dislodged the enemy from a small entrenchment with two guns, which was supposed to cover the passage. Once more the Chinese were taught the absurdity of neglecting to properly protect their flanks. On the morning of Oct. 25, while the main body was crossing the river, this advanced detachment pushed on to the fortified village of Fu-Shing (Hushan), and after a couple of hours' hard fighting drove the defenders out of the position. The strength of the defenders is estimated at 3500 men, and their loss at 200. Having accom-

plished his purpose, the colonel fell back on the main body, now in readiness to push on for the principal position held by the Chinese General Sung. This place is called in the telegrams Kuiren Castle, Ku-Lien-Chao, and Chen-Lien-Tcheng, and its distance from the river has been stated to be 30 miles. This appears to be hardly credible, for on Oct. 26 we are told that Gen. Nodzu led his army against the place and discovered it to be deserted. It is not at all clear whether by Chen-Lien-Tcheng is meant the position where Gen. Sung intended to make a stand, or whether it is the place at which we know the Chinese had thrown up batteries on the north bank of the river long before the defeat at Ping-Yang. There have already been rumors that the Chinese had fallen back on Ngan, or, according to some accounts, Fung-Huang-Chang, and therefore it is by no means certain that the act of evacuation had not taken place long previous to this move of the Japanese. In this case we must suppose that there has been some exaggeration in the reports from Wi-Ju through Japanese sources. According to these, the Chinese fled, throwing away their arms; and much war material, stores, 30 guns, and 300 tents were captured in the deserted position. The Japanese secured their hold on the north bank by following up their advantage and seizing Tatung-Kau.

Whether the Japanese will advance towards Moukden appears uncertain. It is alleged, on the one hand, that winter is more favorable for operations in this part of Manchuria, because, when the snow hardens on the ground, roads can be dispensed with, and movements carried out with more celerity and despatch. On the other, it is to be remembered that the climate is unusually severe, the distance to Moukden is nearly 150 miles, and that there is still a Chinese army somewhere on the route. Moreover, every step is one further from their base, and must make the transport of supplies and provisions more difficult. It seems almost incredible that if, as the Japanese represent to have been the case, there were 16,000 or 20,000 men at Chen-Lien-Tcheng, this large force can have been marched back to Ngan, which is half-way on the road to Moukden and close to Fung-Hwang-Ting, in the time mentioned. It seems, therefore, likely that the real resistance will be met, if an advance is carried out, at some point further from the Yalu, and that it is at least too soon to suppose that the invaders will find it all plain sailing if they determine to prosecute their intention of a march on Moukden.

There is considerable obscurity in the telegrams relating to the second invasion of Chinese territory. It is alleged that 20,000 men under Count Oyama, the expeditionary force from Hiroshima, reported to have sailed more than a month ago, has effected a landing in Talien Bay (Talien-Wan) for the purpose of investing Port Arthur. Indeed, a telegram from Washington, said to have been sent by the United States Minister in Pekin, speaks of the capture of an outlying fort. If this be true it is clear that the Japanese fleet holds the sea communications, otherwise the transports would never have been sent across the Yellow Sea, and a landing would not have been attempted. Admiral Ting's ships, or some of them, were reported to have left Port Arthur and arrived at Wei-Hai-Wei last week, and then again we are told that he had put to sea. Now we learn that he

has gone south and that the Japanese fleet is in chase of him, while other and presumably smaller vessels, or improvised cruisers, are blockading the Gulf of Pechili. However this may be, it seems that at last the Japanese are about to make an attempt to seize Port Arthur and thereby strike a heavy blow at their enemy. Of the importance of this arsenal there is no question; and assured of a footing here the invaders will be in the very best position in the coming spring for an advance on Pekin. It was from this place as its base that the English force set out for the Pehtang in 1860, and conducted the successful operations which led to the capital. But Port Arthur should not fall easily if well defended. The fortifications consist mostly of modern earthworks. On the west, as the port is entered, there is a fort 350 ft. above the sea level, which mounts four heavy Krupp guns, and a second fort, 266 ft. in elevation, mounting three heavy Krupps. On Tiger's Tail—a bank in the west harbor—is a battery of two Krupps. The defenses on the east consist of four forts, one of which is at an elevation of 459 ft.; it is armed with three heavy Krupps and a saluting battery of six guns. Another battery, facing Tiger's Tail, mounts three light Krupp guns and four small muzzle-loaders. In the west harbor, protected from the sea, is the torpedo depot; and on the north and east sides of Tumulus Knoll there are three well-sheltered powder magazines and a fourth for gun-cotton, all of which are connected by tram lines with the harbor. The garrison is distributed amongst so-called camps or forts (mud constructed), each capable of holding from 400 to 500 men. To these defenses others have been added since the war commenced, and mostly on the land side of the port.

THE FALL OF PORT ARTHUR.

The chief naval arsenal and dockyard of China fell into the hands of the Japanese troops on the morning of Nov. 22, before which fighting had been continuous from noon on the 20th. It would be difficult to overestimate the importance of this successful achievement. The mere transference of a well-equipped arsenal, full of stores, and in working order, from one side to the other would have a profound effect upon the course of any war. How much more so when the position occupied by this arsenal is one of great strategical value as a base for further operations. If the losers were of any other nation than China, we might reasonably expect also that such a disaster would exercise a great moral influence, but in this respect we must discount the effect somewhat, so impregnable are the Chinamen in their stupidity and arrogant contempt for their opponents. Indeed, it is quite possible that the Central Government may even now regard with equanimity the fall of their dockyard just as they have the devastation of Manchuria and the loss of the Korea. It is well understood by the Japanese, however, that it is in Pekin that they must dictate terms, and there is no question that the Chinese themselves expect an attack upon the capital. To meet such an assault hundreds and hundreds of troops have been assembled along the coast of Chih-Li, but whether these men are any better armed and disciplined than those which have already met the Japanese is very doubtful. The weak point on the coast of the Liao-Yang Gulf appears to be near Shan-Hai-Nuan, where the great wall of China touches the sea, and where

the railway from Tientsin ends. If the Japanese can land hereabout under cover of the guns of their ships and these defenses collapse, as those on the Yalu and at Port Arthur have, a week would probably see the victors in Pekin. We should expect the railway, which is about 180 miles in length, to be destroyed by the retreating army, were it not for the circumstance that the beaten Chinamen at Port Arthur took no steps to make away with the stores and dockyard plant. Everywhere they leave supplies for the enemy, and the Japanese must have captured guns and ammunition worth a million of pounds sterling. Apart also from the attempt over-sea, which some people imagine to be impossible because of the natural difficulties, owing to the ice in the gulf, difficulties however, which have been exaggerated, it is quite within the bounds of probability that a simultaneous movement may take place by land. Marshal Yamagata is already at the head of the Liao-Yang Gulf and may be heard of at Newchwang at any moment. He may, therefore, prosecute his advance in this direction instead of towards Moukden, in which case he should turn the left flank of the Chinese defense. It is extremely likely that until he is ready to advance by land Count Oyama will rest his troops at Port Arthur. It is characteristic of any movement yet made by the Japanese that nothing has been done in a hurry, and full preparations have been made before a stroke was delivered. In every case the action of the land armies followed the earlier successes of the fleet. The battle off Asan, in which the *Yoshino*, *Naniwa* and *Hiyei* engaged three Chinese warships, capturing one, destroying another, and driving the third away, cleared the southern Korean waters of Chinese ships, and made safe the transport of troops which, under Count Yamagata, fought at Ping-Kang and Chin Lin-Tcheng and are over running Manchuria. The battle of the Yalu in its turn threw the coast of China open and led to the fall of Port Arthur. As we assumed last week, the demoralization of the Chinese fleet was completed by the accidental stranding of the *Chen-Yuen*, and the suicide of her commander, the gallant Commodore Liu, who appears to have been one of the few men of ability in the ranks of the Chinese commanders. It is because the Chinese fleet may now be treated as *une quantité négligeable* that the invaders can either proceed to attack Pekin, or, as is very likely, endeavor to seize the island of Formosa. The force which Japan has now on Chinese and Korean soil are said to number—the first army corps under Count Yamataga, 25,000 men, and the second army corps under Count Oyama, 22,000 men, and the third army corps under Viscount Takashima, 24,000 men. Possibly they may do both, for an expedition under Viscount Takashima has already left Hiroshima for the latter purpose. In any case it must not be forgotten that to the Japanese navy every success has been directly due.

THE OPERATIONS OF COUNT OYAMA.

The measured certainty with which the Japanese proceeded to the capture of Port Arthur is as remarkable as anything that has preceded it in the history of the present campaign. With swift decision, and yet with mechanical precision based on long preparation, they marched to their purpose. The details of the steps which brought about this great achievement

will be full of instruction for all future operations in the field. The ripest teachings of history seem to have been grasped, and the fleet has been employed to spread terror and uncertainty along the Chinese coasts in a manner quite masterly. It is very significant of the skill with which Japan proceeds, and the mechanical certainty which characterizes her operations, that on the very day when Marshal Yamagata began the passage of the Yalu for the invasion of Manchuria, Count Oyama, with the second army, numbering 22,000, landed at the base of the Kwang-Tung peninsula for the attack on Port Arthur. The flotilla of 50 transports, assembled at Hiroshima, sailed from Simonoseki on Oct. 19, and on the evening of the 23d arrived off the Takushan promontory, which is at the southern side of the isthmus behind Port Arthur. This promontory separates a narrow cove which has been described as Kerr Bay, and was better adapted for the landing from Talien Bay, which lies more to the southwest. The choice of the landing-place was excellent on all grounds, and the complete success with which the troops were set on shore demonstrates the utter demoralization of the Chinese if any further demonstration were needed. There was yet an opportunity for the Chinese fleet to demonstrate its utility, or at least its own sense of its value, but it did not put in an appearance, although its officers must have known perfectly well what was threatened. The Japanese landed wholly unopposed, and were able to seize a number of Chinese junks laden with timber and mortars designed for the defense of Port Arthur. From this point the Japanese proceeded with leisurely certainty, and disappointed the popular expectation in Tokio that Port Arthur would be assaulted on the Mikado's birthday (Nov. 3).

The defenses which lay before them were considerable, and would have been formidable in the hands of European troops, but they were far inferior to the forts which dominated the entrance to the port. And here again we may note the fatuousness of the Chinese in expending large sums in defenses which could not assure the place. They seem to have expected that the stronghold would be attacked from the sea, but common sense and history alike demonstrate that to engage forts is neither the function nor the true interest of ships.

The landing place was some 40 miles from Port Arthur itself, but preparations were at once set on foot to reduce the outlying defenses at the Kinchow isthmus. A fortnight however elapsed, during which the Japanese were occupied in landing guns and stores and preparing transport. According to Count Oyama's report, the first brigade captured Kinchow on the 6th, and Talienwan on Nov. 7, the Chinese offering little resistance, and retreating southward. The Chinese assert, however, that General Shui made a vigorous defense, fighting throughout the day on the 7th, and was not overpowered until the 8th, when Kinchow was captured. There appears also to have been some hard fighting at Talienwan, but when Admiral Ito put into the bay on the 7th he found the Japanese flag flying from the forts, and was able to open up communication with the shore. It was then that opportunities were offered for deciding the details of the concerted action with Count Oyama, which led to the fall of Port Arthur. Immediately upon the capture of Kinchow and Talienwan, a forward movement was

made, and on the 9th the Japanese attacked the Namquam Pass, which was a very strongly defended neck between Society Bay and Talien Bay. The position was carried after some fighting, and the retreating forces were pursued to the second pass where the resistance was weaker. A third pass some 14 miles from Port Arthur was the scene of hard fighting on the 16th and 17th, between 6000 Chinese and 10,000 Japanese, but the invaders were again victorious.

At this time Admiral Ito was able to telegraph to Hiroshima that the principal vessels of the Chinese fleet were lying at Wei-Hai-Wei, and though he made every effort he could not induce them to come out to meet him, and accordingly, leaving some vessels to watch that port, he returned to Talien Bay to protect Count Oyama's rear.

The real attack, upon Port Arthur, lasted from dawn on the 20th ult. till the night of the 21st ult. The Chinese made a better defense than on any previous occasion. The entrance to the harbor is 900 feet across. On the west side there are five forts at heights of 350 feet, 400 feet, 270 feet, and 150 feet on a narrow spit commanding the entrance. On the east side there are three large forts at heights of 410 feet, 83 feet, and 180 feet respectively. The heavy guns of 21 cm. are mostly on the seaward side. At the entrance of the port were two rows of mines. Encircling the port are high hills, on which had been constructed breastworks and rifle pits. There were from 60 to 80 Nordenfelt and field guns of from 8 cm. to 12 cm. on the west side, six guns on the north side, near the sea, and four on the other hills to the northeast. The highest breastwork was 300 odd feet above the sea. The contour of the country was most favorable to the Chinese, who were in an apparently unassailable position.

Count Oyama, after bombarding the enemy's position on the 19th, with nearly 100 guns, delivered his attack on the landward fortifications on the 20th. The village of Shui-Si-Ching had been captured on the previous afternoon, and at dawn a range of low hills northwest of Port Arthur was carried with a rush. The guns were then dragged into position, and a vigorous fire on both sides was opened, the Chinese using their Gatlings with great effect. The Kishikan Fort was first carried, and at 11.30 A. M. the mixed brigade on the left stormed the fort of Niriusan. At two o'clock the first division, which formed the right wing, entered the town of Port Arthur, and carried the positions on the Kowkin Hills. It had served splendidly in capturing the fort of Kokinsar, which was strengthened by trenches and loopholed mud walls, and at three o'clock the western side of the stronghold was in its hands. The left division advanced over broken ground, taking skilful advantage of cover, and, after an artillery duel, the final attack was delivered in splendid style. On the following morning Laomin and other forts were attacked in succession, and carried without serious loss, and by four o'clock in the afternoon the whole of the defenses were in the hands of the Japanese. Count Oyama returns the Japanese loss at over 200 officers and men killed and wounded. The Chinese are reported to have had about 2000 killed and wounded and several thousand prisoners, with some 80 guns and mortars, and vast quantities of ammunition were captured, as well as the arsenal and such vessels as were in the port.

THE MARCH TOWARD MOUKDEN.

The advance of Field-Marshal Count Yamagata has been as successful as that of his brother general in the Kwang-Tung peninsula. As we know, when he found himself in front of the Chinese position at Chin-Lien-Tcheng he occupied a long stretch of the river, so that his point of crossing remained to the last moment uncertain. The position of Chin-Lien-Tcheng is in the western corner formed by the junction of the Ai River with the Yalu. Just across the Ai are the heights of Hushan. After the advanced guard of Yamagata's force under Colonel Sato had crossed 10 miles up the river at Shai-Ken-Chan, they attacked Hushan from the northeast on October 24 (the same day Oyama landed), while the main body of the army crossing the river attacked it from the south. The Chinamen made a good resistance, and maintained a resolute fire until thrown into confusion by a flanking movement which placed a large force on their left rear. They then gave way, and retired to Chin-Lien-Tcheng. In this action, in which the Chinese had all the advantages of an elevated position, good fortifications and plenty of men, they lost 250 killed and many wounded, whereas the Japanese lost only 20 killed and had 83 wounded. The Chinese kept up a cannonade from Chin-Lien-Tcheng all night, but in the morning, October 26, the place was found to be deserted, the garrison having fled to Feng-Hwang-Tcheng. The garrison of Chen-Lien-Tcheng, commanded by General Sung, amounted to about 15,000 men, drawn from Talien, Port Arthur and Lu-Tai. On October 29 General Nodzu, with the Japanese cavalry, arrived at Feng-Hwang-Tcheng, and found that the enemy had fled after setting fire to the place. The town was taken possession of on the following day, the Chinese having fallen back to a pass in the Mo-Thien-Ling Hills on the road to Liao-Yang. Here General Nieh reported that he was attacked by the Japanese on November 11th, and again on the 12th, but that on each occasion he repulsed the attack, and on the last occasion followed up his success by an advance toward Feng-Hwang-Tcheng. It appears that after reaching Feng-Hwang-Tcheng Count Yamagata divided his forces, one portion operating against General Nieh in the Mo-Thien-Ling Hills, and the other following up General Ma, who had been wounded at Chin-Lien-Tcheng. On Nov. 14 the cavalry, which had followed the Japanese after the skirmishes of the two previous days, was attacked by the right column in force and completely routed. The town of Liu-San-Kuan was occupied without opposition.

On Nov. 15 the left column which had occupied Taku-Shan (near where the Chinese troops were landed before the battle of the Yalu) left this place and, marching by way of the Liao-Yang River, entered on the 18th the important town of Sin-Yen, where 6000 Chinese cavalry under General Ma were reported to have assembled. No troops were found in the town, but five guns were captured here. The Chinese cavalry had retreated in the direction of Hai-Tcheng. Apparently they joined hands with other Chinese troops under General Sung, for on Nov. 21 that officer, who was evidently marching to attempt a relief of Port Arthur, attacked Kinchow and Talien, endeavoring to retake them. The attempt nearly succeeded, but the Japanese artillery at last turned the day, and the Chinese retreated.

On Nov. 25 General Nieh again attacked the right column. The Japanese were moving upon the Fen-Shui pass when the attack was delivered on the right flank and pushed well home. For a while there was close fighting, but the Japanese mountain and machine guns coming into action, the attack was repulsed and the Chinese fled. Count Yamagata then occupied the Mo-Thien-Ling Pass and the town of Lang-Tsu. He is believed now to have occupied the city of Liao-Yang, which is 40 miles from Moukden.

DISCUSSION OF THE CAMPAIGN, BY COLONEL MAURICE.

From the United Service Magazine, London.

Writing last month I professed an absolute disbelief in the alleged design of the Japanese to land a force at this time of year on the western shore of the Gulf of Pechili, or in the Gulf of Liau-Tong, in the neighborhood of Newchwang. Reports continued for a long time afterwards to come in alleging that such a landing had actually taken place. It was reported about the time when my last article was going to press that an expedition was actually starting from Japan. I ventured to doubt whether from any indications we had had it was possible for the Japanese to supply transport for more than 10,000 men at one move. I mention these things not because I want, now that opinion is coming rapidly round to the view I then held, to claim that I was right, but because my doing so will enable me to explain what I believe to have been happening. Supposing that the Japanese could only transport the force they had available by successive installments, then it would be natural that they should do what both we and the French were obliged to do during the war of 1860. The French then collected their forces at Chefoo. It has been consistently reported that the Japanese have occupied an island in the neighborhood of Korea Bay, containing a convenient roadstead "Thornton Haven." A significant telegram has lately come in announcing that they have now abandoned it. If that be true it probably means that the gathered force has been moved to strike its blow. Where has it gone? To me it seemed that there were two objects for which it might usefully be employed: one the most pressing in point of time, the other the most important in its probable effect on the war. Writing in reply to a leader in the *Daily News*, I said that I did not think it quite fair for neutrals to do for one of the belligerents their own proper work, therefore I declined at the moment to state publicly what I meant, but as I mentioned, I wrote my views in full to a friend in order that I might be committed to them.

As there can be no harm now in saying what I thought, and as the actual blows I anticipated have not yet been delivered, though I think they will very soon be so, I shall now explain. It seemed to me then that, whatever else he did, Yamagata must first of all dispose of the Chinese force in Southern Manchuria, and as apparently that force was encamped on the north of the Yalu it would greatly facilitate his attack, and tend to insure his victory, if he landed a considerable force in the northern part of the Korean Bay, which from its direction ought to be able to take the Chinese army in reverse. It would, however, be useless to attempt this until his own army from the land side in Korea was in a position to engage the

Chinese army in front and perhaps also on their left flank so as to give an opportunity to the force landed for the purpose to deliver its attack simultaneously. The time, therefore, of the delivery of the stroke must depend on the time required for the land army to advance. Now seeing that we have had it recorded on as good authority as we can get, that the main body of the Japanese army has been kept at Ping-Yang whilst only comparatively small parties covering working detachments have been pushed forward towards the Yalu, it seems to me abundantly clear that what Yamagata has been doing is what I described in my last article as obviously his mode of action before Ping-Yang. He has been keeping the main body of his army where he could easily feed it, and has been preparing the way for its rapid advance by pushing forward heavy stores, improving roads, and accumulating supplies. I do not think that the time occupied in doing this has been unduly long, though by this time he may have been able to advance and possibly has moved his army already to the front. If it be true that the expedition has left Thornton Haven probably he has moved forward. Possibly he may himself accompany the landing expedition. I do not see much ground for the claim which Sir P. Halliday is putting forward in all the papers, that the fact that the main army had not till recently left Ping-Yang proves that the Japanese have shot their last bolt. On the contrary, as with the case of Ping-Yang, I think they are adopting the course which will in the long run most hasten and facilitate their movements. That the delay is producing great irritation in Japan I can well believe. It was precisely the effect which was produced in England by the keeping back from the front at Ismailia of the main mass of the army, whilst we were accumulating our supplies, up to the moment when we were ready to advance on Tel-el-Kebir. I remember Sir John Adye complaining bitterly to me of the numbers of letters of despair from by no means insignificant persons that he was receiving by every mail from England. They only echoed the universally expressed popular opinion. I have no doubt he will bear me out in my statement. Till we actually moved forward his announcement that we should have finished our campaign at about the time we did was received with exactly the same incredulity as Lord Wolseley's announcement before we left England that the war would be over in three months. If the *Daily News*, which disbelieves in "prophets," will do me the honor to refer to their files for the month of '82, when the expedition was about to leave England, they will find that it was in them that that prediction was recorded, and they will find what was certainly understood at the time to be their skeptical comment thereon. Yet though the work was done strictly to time, that in no way diminished the cry against the "delay" which was taking place just as it is now taking place in Korea. Small wonder, therefore, if the Japanese are alarmed. They have not had the opportunity of repeating the same experience in so many expeditions as England. Yet England has never learnt the lesson, and will, I venture to predict, repeat the same mistake when we send our next expedition abroad. If, as I should incline to suppose will be the case, Yamagata breaks up this force on the Yalu, then the revulsion will be the same as after the battle of Ping-Yang.

We shall be told again that Yamagata is marching on Pekin in the sense

that he is going to "make a dash" on the capital. I say now, as before, that that is "absurd." Armies of the necessary size and equipment cannot make dashes in this sense, more especially in the middle of winter. The effect of the battle ought to be to lay Southern Manchuria at the feet of Yamagata, and greatly to facilitate his further operations, supposing that he is able to tackle the main army in these regions. Its moral effect will be again enormous, but the end is not yet. I think he must move forward some distance on Moukden, though whether he can capture that important point before the winter sets in seems very uncertain. He may possibly, though I hardly think the weather will permit even that, seize Newchang.

I think it may safely be assumed that the news of fighting on the Yalu, which we have just received, represents either a first day's operations, in which it has been the business of the main army, or such of them as are up, to engage and occupy the Chinese whilst other forces are preparing to deliver their blows on flanks and rear, or else, if the preliminaries are not so far advanced, a mere reconnaissance in force.

To turn, however, now to the second enterprise of which I spoke. The *Spectator* correctly surmised that what I referred to was the capture of Port Arthur, not, however, merely for the sake of seizing the place itself, but because the Chinese fleet, damaged at the Yalu, had taken refuge there. Curiously enough it was not till nearly a fortnight afterwards that the report of an expedition for that purpose reached England, and that the importance of the movement was discussed. The reports as to the condition of the Chinese fleet under repair have varied so greatly and have been so contradictory, that it is difficult now to know whether, as has been lately asserted, their resuscitation has been completed, or whether on the contrary, they will be confined to port for the whole winter. Obviously, it will make all the difference in the value of Port Arthur to the Japanese, whether they are or are not able to capture within it the whole of the remainder of the northern fleet. What I referred to as the means by which Yamagata might bring China to her knees without an attempt this winter upon Pekin was not merely the capture of Port Arthur, but with it the capture or destruction of this fleet. For in either event it must give to the Japanese a—for the war at least—final and absolute supremacy at sea. With Port Arthur in their hands they would next spring be able to collect their transports at the very point which we selected for our gathering, namely, Taliewan Bay. They would probably be able to seize Chefoo also, and thus start from the two points selected by us. The question of course is whether by next spring sufficient order will or will not have been introduced into the Chinese levies to enable them to resist a landing or effectually oppose an advance upon Pekin. What will happen if the Japanese succeed in capturing the northern fleet, and in good time in the spring forcing a landing which will enable them to use the Peiho for assisting their movement on Pekin? I hardly think that the mere gathering of numbers of bow and arrow men will insure an effective resistance. Indeed, if the expedition be conducted with the care and skill which has hitherto characterized it, I should think that the chances ought to be in favor of the Japanese.

There is, however, one possible explanation of the fact that we have not

yet heard anything of the expedition from Japan, viz., that it has taken nearly all the month to collect the necessary transports and to embark the heavy stores required. There is a fleet of merchant vessels which has been specially encouraged by the Japanese government with a view to military emergencies, and it may possibly be the case, that, though during the earlier concentration of the troops in Korea they preferred to send them off in bodies of 5000 strong at a time, yet that this was due, not to their being unable to collect more transport, but to the fact that they could not conveniently embark troops on board more than a limited number of ships from the docks. It is therefore at least possible that the expedition may have been waiting in the various harbors till all were ready to start together. Whatever therefore may be the destination of the expedition, it is by no means certain that the fact that it has not been heard of means more than that it has only recently started or is about to start.

In weighing the news from the East there is one important fact which is apt to be forgotten, viz., that the telegraphic news which is published in London is by no means telegraphed in the form in which it is issued to the press. Every word costs seven shillings for despatch from China to England. Naturally, therefore, the words used are cut down to their very minimum. I think that in considering how far we may trust, for instance, the actual official Japanese despatches, it is only fair that this should be taken into account. Thus, when after the naval battle at the Yalu, we were told that the Japanese had sustained "no loss," the statement was so obviously absurd that it is impossible that any one can have sent it with the intention of deceiving, because it was certain that no one would believe it. The message sent was no doubt intended to convey the meaning that no ship had been lost. To this statement the Japanese have steadily adhered up to the present. On the other hand, it is practically certain that the reports of Japanese landings at every possible point have been the work of Japanese agents, and are a part of the organized scheme of the war to create confusion and alarm. There is no doubt that Japanese agents, Chinamen even more than Japanese, have obtained immense influence in the secret societies which are spread everywhere among the population of China. It is almost certain that the rebellion recently started in Hankow province was their work, and, as some at least of the largest of the secret societies are designed for the overthrow of the present dynasty, and the restoration of the old Ming family, that is a feature of the case which may assume a very important development should the Japanese achieve any further important success.

A striking article which appeared in the *St. James's Gazette* about a fortnight ago drew a very powerful sketch of the marvellous effect upon the world which might be produced if the Japanese succeeded in displacing what, after all, is the alien Manchu-Tartar dynasty, and administering the enormous resources of China with all the European knowledge and administrative skill that they have shown in their own country. There was no attempt to do more than to deal with the question as a lively speculation of conceivable possibilities, but there is one aspect under which the question is an immediately practical and serious one. The Japanese are cer-

tainly not lacking in ambition. What has presented itself to others at a distance as conceivable, may easily have fired their ambition as attainable. Lord Wolseley, who had, during the 1860 campaign, especial opportunities, as the officer at the head of the Intelligence Department of the expedition, of studying China closely, looks upon such a dream as quite beyond possible fulfilment. He looks upon it as practically certain that the effect of the war will be to rouse China out of her long lethargy and to induce her to apply to her boundless resources the European methods which have made Japan so formidable to her. He has always looked forward to a time when some great organizer would succeed in turning the enormous undeveloped power of China into effective fighting force. He believes now that after the fright into which the court of Pekin has been thrown, European officers will be invited to organize the Chinese armies and fleets, and that the whole power of the court will be effectually used to support them. In that case he believes that the most formidable power in the world will be developed out of what has hitherto been the great passive, conservative empire of China. Now this danger also must be present to the minds of Japanese statesmen. Fired by the hope of possibly seizing the reins of government of such an enormous and, for the most part, very easily-governed country, and dreading the vengeance which will certainly fall upon them if they succeed only in rousing and not in crushing their secular enemy, it may well be that no mere indemnity and no mere possession of Korea will satisfy them as terms of peace. Moreover, it is of course conceivable that they may think that whatever the risks of a winter campaign may be, it is better for them to stake their all upon the die than to give to China the opportunity of recovering during the winter. Lord Wolseley looks upon a winter campaign in the neighborhood of Pekin as quite impossible. Apparently there is a very great difference in different years between the dates at which the real severity of winter begins. In 1860 the river Peiho was frozen over completely by the 25th November so that all navigation was impossible. Others say that it is often frozen by the end of October, while last year even the north of the Liau-tong Gulf was open on December 4th. As, however, should the Japanese now attempt a movement by sea upon Pekin they cannot possibly have completed their landing much before the end of the first week in November, they have a very narrow margin of time within which they can effect their movement on Pekin, and have any communication open with their ships. If they should attempt it it must be upon the calculation that their success will be so decided as to enable them to maintain themselves in the country without support from their fleet till the winter is over. I confess I have hitherto looked upon this as dangerous beyond calculation, but it is just possible that the Japanese, well informed as to the internal condition of the kingdom, may think it worth the risk. We ourselves took the Taku forts by the evening of August 21st, having landed at Tientsin on August 1st, yet on our return from Pekin we only just managed to get away before the ice stopped navigation. Moreover, our army and the French together only numbered about 18,000 men. It seems hardly possible that in the present condition of the Chinese forces the Japanese should attempt a movement

on the capital without a much more considerable army, especially as they must be able to maintain their position till the spring. The larger army the longer it must take to provide with stores and equipment, which it will take a considerable time to land. It is difficult, therefore, to see how the Japanese could even begin their march for the capital before the snow begins to fall. Therefore, I still think that, as a military scheme, this would be a very risky move indeed, compared with the seizure of the fleet, and the reduction of Port Arthur with a view to movement on Pekin in the spring.

On the other hand, I think that the assumption which has been made by many writers that even if the Japanese succeeded in capturing Pekin they would effect nothing; because the court would simply abandon the capital and retire, does not take account of the effect which was produced by the desertion of his capital by the Chinese emperor in 1860. Lord Wolseley in his history of the 1860 campaign gives long extracts from a series of memoranda addressed to the dragon throne by the censors and other ministers of the empire, in which the emperor is asked in very plain terms if he realizes what he is doing. He is told that "the man of heroic conduct is prepared to die at his post." "Your Majesty is well aware of the maxim that the prince is bound to sacrifice himself for his country." "In what light does your Majesty regard your people, and the altars of your gods? Will you cast away the inheritance of your ancestors like a damaged shoe? What would history say of your Majesty for a thousand future generations?" Even more significant is the fact that the advice to the emperor to take a hunting tour in the north, is believed to have been given him by Sang-ko-lin-sin in order so thoroughly to shake the confidence of the people in him, that he, Sang-ko-lin-sin, himself might be able to usurp the throne. As Lord Wolseley, in his volume on the war puts it: "Usurpations of such a nature are not unfamiliar to the Chinese people, and so great have been the reverses experienced since 1840 by the present dynasty, that it has long since ceased to carry with it any great respect, and, consequently, any strong attachment on the part of the Chinese people." (Narrative of the War with China in 1860, by Lieut.-Colonel G. J. Wolseley, p. 256.) Now supposing that, for a second time, the court were to expose itself to similar censure, seeing that the ministers warned the emperor, even in 1861, that "the danger was most threatening," "a puff of breath is now sufficient to decide the balance in which hangs the loss or preservation of the succession of your ancestors and the repose of the deities," may not the Japanese, perhaps, calculate that with their influence on the secret societies, they would be able to stir up such a storm in behalf of the Ming dynasty, that they would be able to seat it on the dragon throne, and administer the kingdom through it. In any case they may well propose to attempt, ultimately, to move on Pekin, under the conviction that either the court must await their coming and take all the consequences of a siege, or that its hold on its subjects would be dangerously shaken by flight.

It is noteworthy that ministers in England were, as Sidney Herbert told Sir Hope Grant, in the greatest anxiety lest we should then find that the court had only fled into the north, and that we should be forced into a

winter campaign. Even though the emperor did go then, the effect of his disappearance upon the people was so great that he was obliged to make peace in order to return to his capital.

Whether therefore through Japanese agency, or by a revival of China consequent upon the rude awakening she has had, it is by no means impossible that this war may be leading up to consequences more far-reaching in their effect upon the world than any war since that which ended at Waterloo. If the 300 millions of Chinamen were to come under a military system based upon the German, in the same fashion that the Japanese have already done so, it is difficult to see the consequences that may follow, but that they would be of tremendous potency it is hard to doubt. Further, I think it may now be safely assumed that if the Japanese fleet had been able when the war began to engage the Chinese even with such success as attended their action at the Yalu, then it would have been possible for the Japanese army to have been landed on the west coast of the Gulf of Pechili, and to havemarched on Pekin.

PORT ARTHUR.

From the Army and Navy Gazette.

A powerful fortress has fallen in forty-eight hours before the attack of but slightly superior force—so far as regards numbers. All preconceived notions, therefore, as to the reduction of a fortified position by the tedious process of siege tactics have been set aside. So far as can be gathered, two strong bodies of infantry advanced to the attack, with artillery in the centre, and, under cover of a crushing and concentrated fire from the latter, the former carried all the works, one after another; the resistance of the better-designed permanent works on the Japanese left flank being the only element which prevented the completion of the business before night-fall of the first day. It is clear then that there must be some means of accounting for the ease and rapidity with which the Chinese were swept out of their positions. Granted that they were demoralized by their countrymen's previous defeats; that the Japanese were flushed with victory; that the attention of the fort gunners was distracted by the cruisers steaming about in the offing. None of these circumstances, however, will account for the reduction—practically—in a few hours of a perfectly equipped and fairly well manned fortress, mounting one hundred heavy guns. We cannot but believe that it is necessary to look quite in another direction for the solution of the problem.

After the investment of Paris in 1870–71, Germany and other continental nations—as a result of observations upon the extent of the injury caused to fortified positions by gun fire—went into the matter of providing field artillery regiments with certain batteries of light and short howitzers for moving swiftly upon entrenched positions and works, and crushing them by weight of metal and high-angle fire. Krupp of Essen has produced a field howitzer of moderate size, which throws a shell of 36 kilos weight, though only 12-centimetres calibre, and a very considerable number of batteries of German artillery are equipped with it. We understand that the Japanese force of artillery, which has been almost exclusively supplied by

Messrs. Krupp and Sons with field and siege guns, is in possession of many of these howitzers, and that the regular siege train was not employed in any of the recent attacks upon positions. Should our surmise be correct, and the crushing success of the attack upon the Port Arthur batteries have been due—even in part, at least—to the presence of these most potent little high-angle howitzers, the problem is half solved already. The refugees who have arrived at Chefoo report that the fire was so concentrated as to be absolutely irresistible. Such a result is just what we should have anticipated from the weapons under consideration.

One word of warning then. Our artillery, except that of a heavy siege character, is utterly unprovided with a weapon for breaching and destroying buildings or earthworks. To employ an ordinary 12-pounder for this purpose would be absurd. We commend a consideration of the 12-centimetre 36-kilo. howitzer to our artillery authorities at the Horse Guards. It requires a heavy ammunition wagon, and the projectile is very long, almost protruding from the muzzle of the gun, but its effective power is tremendous. It has three separate charges for different angles and ranges. A weapon of this character would, we are persuaded, be of incalculable service to our forces in the event of the rapid reduction of a fortified position requiring to be undertaken.

CORRIGENDUM.

There should have been a foot-note to Lieut. Reichmann's translation of Major Wachs' able article on "The Future of the West Indies and the NicaraguaCanal" in the November JOURNAL stating that the author was indebted to Captain Theo. A. Bingham, U. S. Engineer Corps, Military Attaché at Rome, Italy, for valuable information and assistance in the preparation of the article.

Military Notes.

REVOLVER SHOOTING.

THE following notes on revolver shooting have been compiled by Col. Symons, Assistant Adjt.-Gen. for Musketry, and will be embodied in the ninth edition of Capt. Campbell's "Rifle Fire":—

"At the *Field* trials of Webley's revolver, Mark I, before its introduction to the army, 2330 shots were fired from one without taking it apart. Fifty shots were then fired from it as rapidly as possible, and after allowing time for the barrel to cool, 12 shots were fired from a rest. The range was 20 yards, and every shot struck a 3-in. bull's-eye. This trial proved that the severe test the revolver had undergone had not impaired its accuracy. At 12 yards the Service bullet penetrates nine half-inch deal boards, and consequently is considered a powerful man-stopping weapon. The question is often asked, What is a good position for revolver shooting? The one here advocated is in some respects similar to that used by fencers.

"If employing the right hand, stand so that the left foot points to the left and at right angles to the right foot, which should be advanced about its own length, or a little further, in front of the left heel, toe pointing straight to the front, knees kept straight, but without constraint, body evenly balanced. Raise the revolver in the right hand and take aim, keeping the wrist bent but supple, and muscles of the arm relaxed, elbow bent and closed inwards, much in the same manner as the left elbow is held at the 'present' standing when firing with the rifle. In this position the elbow will be immediately over the instep. Thus the right foot, knee, elbow, and sights will be in one and the same vertical plane with the mark aimed at. To further balance the body, and act as a counterpoise to the extended right arm, place the left hand, or knuckles, upon the left hip, elbow pointing to the left rear. A modification of this position, known as the French duelling position, is to keep the feet somewhat further apart, the right arm bent as above, but the elbow turned outwards and kept well up, nearly level with the shoulder. It is considered by many that there is less strain on the muscles of the arm in this position than in any other.

"There are two methods of holding the revolver at the 'present.' The first applies to match shooting, especially with the long-handled revolver at fixed targets, when the firer can aim in his own time. The second applies to all quick-shooting practices, in which the Webley Service pattern revolver is generally used. The 'pull off' of most match revolvers is slighty over 4lb. The main difficulty in revolver shooting is to get a satisfactory 'let off.' Were it allowable to reduce the 'pull off' to, say, 2lb., a great ad-

vantage would be gained. But this, for the sake of safety, is not generally permissible. If, however, the firer can regulate the manner in which he presses the trigger so that the 'pull off' appears as light as, say, 2lb., he secures an advantage not to be neglected, and this can be effected in the following manner:—Having full-cocked the revolver and brought it to the 'present,' let the muzzle droop slightly downwards by relaxing the grasp of the stock; hook the forefinger round the trigger, as when rifle shooting, so that on its second phalange may fall a considerable part of the weight of the weapon, which weight must be retained there. To insure this gently raise the muzzle, without in the slightest degree displacing the forefinger, until the sights are aligned on the mark, holding the stock lightly, and as far back as possible, with just sufficient pressure of the second, third, and, perhaps, fourth, fingers to prevent the muzzle dropping. No attempt should be made to place the thumb round the stock. On the contrary, it should rest lightly along the top of it, and point diagonally upwards towards the left front. Then, maintaining the aim, gently bring pressure of the thumb to bear on the top of the stock. It will soon be found that, thumb and eye working together, pressure can be released or increased instinctively, as the aim is lost or recovered. The 'pull off' will seem very light owing to a great part of the weight of the revolver resting on the forefinger. After a little practice the firer will find that he can gauge the requisite pressure to a nicety, and the hammer will fall at the desired instant. A small variation of grip advocated by many good revolver shots is to place the little finger under the toe of the butt, and not round the stock.

"The second method of holding the revolver is specially applicable to the Service pattern revolver, in timed or moving object practices which approach more nearly to Service conditions. Grasp the revolver solidly in the hand, so that the ball of the thumb presses against the top of the stock, the forefinger well round the trigger, the tip of it pointing straight to the rear. With this grip the elbow cannot be kept quite so bent or inclined inwards as in the first method, paragraph 4. Attention should be paid to the squeezing with the ball of the thumb, which should also take most of the recoil of the explosion. The 'pull off' will then appear comparatively very easy. The revolver, when drawn and loaded, should be carried in the right hand, muzzle upwards, with the arm bent, and the wrist a little higher than the elbow. To fire raise the revolver over the right shoulder, as high as the head, and bring it down sharply on the target or object, with the arm fully extended. The movement is that of a throw. The trigger must be pressed the moment the hand drops, and there must be no dwelling on the aim. This method of firing when mounted, either at the half or on the move, is the safest and best possible, both for single and continuous practices. On some ranges a practical advancing and retiring object may be readily obtained by utilizing the existing line of rails. If a small stop butt be erected at one flank, and the firer stands at the other end of the line of rails, he can have the figure, on a light trolley, pulled towards or away from him at any desired pace.

"In aiming at an advancing or retiring man a quick aim should be taken at the lower part of the body and a full sight used. Take a quick aim in the centre of the object by the second method, with a full sight. Then,

having carried the aim the desired distance in front, keep the right arm and hand perfectly steady, and maintain a constant lateral allowance of aim in front of the object by swinging round on the hips. A good position and method of holding the revolver and pressing the trigger are essentials. When these have been acquired, as they can be by snapping, plenty of practice with ball ammunition should follow. A weakness in all revolvers is the liability to jam after a shot is fired. Presuming a revolver and all its works to be perfectly clean, the cause of a jam is generally due to a cartridge case blowing back against the shield, or false breech. If this be wiped clean and well oiled before commencing a practice the chances of a jam will be much lessened."—*The Army and Navy Gazette.*

MAGAZINE PISTOLS.

Several inventors are reported to be struggling with the problem of magazine pistols. The advantages of such an arm are great and obvious. So long as the powder-chamber (*i. e.*, the cylinder) and the barrel are separate the revolver cannot lay claim to the title of an arm of precision or high power. The break in the arm where cylinder and barrel meet, or are supposed to meet, permits a considerable escape of gas with a resulting loss of pressure and consequent reduction of velocity. Any attempt to increase the velocity by the use of longer and more powerful ammunition adds unduly to the length and weight of the arm without equivalent gain, for the higher and longer sustained the powder pressure the greater the escape of gas. Moreover, the present ammunition gives quite recoil enough. The defects of the revolver seem inseparable from the fundamental principles of its construction, and it is a recognition of this fact that has led to the present investigations of the possibilities of magazine pistols. Present indications seem to point to the following characteristics, which it is desirable for the arm to possess: A calibre of about .32 (say 8 millimetres); a lead bullet with nickel, steel or copper envelope; a length of barrel, measured from the base of the bullet, of about 25 calibres; a bottled-shaped cartridge with unusually large, but short powder space, to reduce the length of the cartridge as much as possible, and charged with quick-burning powder; the energy of recoil to be utilized to extract, load and cock the firing-pin or device; this will admit of a light pull, say not over four pounds; a cocking device for single-shot firing; a detachable magazine to hold four to eight cartridges; a simple, efficient safety catch, convenient to the touch, but protected against possible disturbance while drawing the pistol or returning it to the holster or frog, or while being carried in one or the other; a smooth exterior, as free of projections as possible; a strong, powerful grip; lastly, as great simplicity and strength of parts as are consistent with proper lightness and other qualities. What desirable qualities may be sacrficed to secure absolute efficiency only experience in service can decide. It is too often forgotten that arms must be suited to those who are to use them, and many desirable features must often be omitted, or their presence may make the weapon almost valueless for its designed use.—*The United Service, Philadelphia.*

NEW NORMAL ATTACK IN FRENCH ARMY.

According to *The Times* correspondent with the French army during the last manœuvres, the attack was normally delivered as follows: "The shooting line and supports are amalgamated from the first, and the battalion is formed in two lines, two companies in each, each company initially in a line of sections in column of fours at twice deploying intervals. The front is covered by scouts, 16 to each company, thus the normal frontage of a battalion in attack is equal to its front two deep. The distance between the following lines at first is from 300 to 400 yards. The procedure in an attack is as follows: On coming within the zone of artillery fire the above formation is assumed, and in it the battalion approaches, as quickly as possible, the enemy's position. On the arrival at about 1200 yards from it, the column of fours form front in single rank, and the leading line of the battalion then becomes a single rank of men, elbow to elbow. In this formation it is continued up to 700 or 800 yards, when fire is opened, and from this point the advance is continued by alternate companies or even larger units, but no doubling is allowed, and every effort is made to keep the men in hand and in good wind. Within about 500 yards individual fire is the rule; beyond that range volleys by sections. The second line companies did not usually reinforce the first line until the latter were preparing for the assault by magazine fire at about 200 yards range. A most striking point was the absence of depth in the formations, even at the decisive points of the attack, as regarded the troops actually making the attack and under fire. A long front, long enough, if possible, to envelop the enemy's flank, seemed to be the point aimed at. Each new accession to the shooting line carried it a little farther, until the last reserves gave the final impulse for the assault. On the defensive, frequent counter-attacks were made by the firing line in the old French style.

"From the larger tactical point of view, the most noteworthy feature was the methodical manner in which the attack of the infantry was prepared. In rear of the line of guns, and out of sight of the enemy's position, the infantry were formed for attack as they came up from the marching columns, and not until the artillery had sufficiently prepared the attack was the signal for the advance given. Once launched, the troops moved on through the line of guns and straight for the enemy's position, with the utmost celerity and steadiness, never wavering and seldom pausing until the decisive fire position was reached."

From the above it is evident that the new regulations have effected a complete change, and one of the utmost importance, in French infantry tactics. This is the attack in the line in its highest development, identical in principle (if not in detail) with the Frederician method. The idea of the "blow" contrasted in the sharpest manner with the method of "attrition," the keynote of the Napoleonic system copied and applied by the Germans in 1870. How enormous the change has been will be realized by contrasting Captain Maude's account of the French manœuvres of 1891, in *The United Service Magazine* (London) for December of that year. In those manœuvres the method of "attrition" was pushed to its utmost consequences. The troops entered the zone of fire in a succession of small éche-

lons, which presented the best possible target to the enemy's fire, the least possible fire effect in reply, and the utmost possible guarantee of disorder and want of control.

Assuming the above account to be correct, and we have no doubt that it is so, then the French by their new regulations, have effected the greatest revolution in infantry tactics since the days of Leuthen, and are now ahead of anything in Europe, though the Germans run them very close indeed.—*Journal Royal U. S. Institution.*

SMALL CALIBRE PROJECTILES.

The recent movement in favor of small calibre arms for use in war has been inspired by several causes. The saving of weight, so that the soldier could carry more cartridges, is an important one. The production of a higher initial velocity is also made possible by the establishment of a heavier powder charge per unit of weight of bullet. To maintain a high average velocity in the face of diminished cross-section the bullet has been greatly elongated, so as to be almost a short arrow. Then, as rapid rotation has to be given it by strong rifling, a steel or other hard metal jacket is put on the bullet to prevent deformation by the lands and grooves, and the problem seems solved. The high initial velocity diminishes in flight so slowly that a low trajectory has been the result, and with one exception the arm is a great improvement on its predecessors of double its calibre. This exception is the lateral deviation due to wind. The ratio of weight to longitudinal section is so unfavorable that it is found that the new bullets are blown to one side by a cross-component of wind.

The action of the wind on a bullet as it leaves the mouth of the barrel is comparable to that of gravity upon a body beginning to fall. The pressure on the side of the bullet represents a force resisted only by the inertia of the mass of the bullet. Of course as the bullet moves laterally the wind exerts less and less force upon it, but for a strong wind and for the first second or two the force is not far from constant.

The force of gravity will carry in value a falling body more than sixteen feet in the first second of its fall. Wind pressure in engineering calculations is taken at a maximum of thirty pounds per square foot. As one of the new bullets has a longitudinal area of about one half a square inch, such a wind pressure would act upon it even more energetically at the start than would gravity. Any strong wind would, it is clear, deflect it rapidly from its course. If rifle practice were carried on in the assumed thirty pound side wind pressure, then the lateral deviation at first would exceed the vertical.

Such an extraordinary condition practically would never occur. But the possibilities which the above figures suggest have been shown to be real, and in a recent trial the deviation due to wind has been found to be very great. While striving for a flat trajectory and for lightness, the effect of wind in producing lateral deviation has apparently been overlooked.

The wind pressure, as has been said, is resisted by the inertia of the bullet, which varies with its mass and weight. If the weight is increased, the deviation due to wind will be decreased. But to enable the lead to stand the strain to which it is subject, it has been found necessary to use a metal

lighter than lead, which makes the bullet still more subject to the action of wind than a pure lead projectile would be.

The high specific gravity of lead, 11.352–11.388, makes it available for small calibre projectiles. Were it possible to use some other metal still heavier, an important advance would be made in the direction of high average velocity as well as of diminished wind action. The very heavy metals are rare. Iridium (hammered) is over twice as heavy as lead. Platinum and gold have nearly as high specific gravity as iridium, and uranium and tungsten come next with specific gravities of 18.33 and 17.00 respectively.

A rather curious suggestion has been made to the effect that tungsten might be used for bullets and shot. This suggestion was based entirely on its high specific gravity, without regard to its other qualities. It seems quite possible that were a demand created for it, it could be produced in quantities at reasonable rates. It is difficultly fusible, combustible and brittle. At least this is as far as the properties are known. But if made in commercial quantities by alloying or otherwise treating it, there would be a chance to modify its disadvantageous properties so as to obtain the advantages due to its high specific gravity. Even now the jacketed bullet is a compound structure whose jacketing interferes with its efficiency. A jacket of tungsten or of uranium would increase its weight, while the present jacket diminishes it. It seems quite probable that a compound bullet of lead and one of these heavy metals could be made which would have considerable value in the present days of small calibre rifles.

Aluminum has attracted most attention from its lightness. Another St. Claire Deville, who would initiate the production of a heavy metal to replace lead where weight is the principal requisite, might exert his powers on the reduction of the ores of tungsten and uranium.—*Scientific American.*

CHANGES OF UNIFORM IN GERMANY.

All the reports from Germany go to show that the changes of uniform recently introduced in the infantry have stood the test of the manœuvres well. The total reduction of weight carried is 6.5 kilos, say 14 lbs.—*Journal Royal U. S. Institution.*

THE PAVESE RANGE-FINDER.

The commission appointed in Italy to determine the best range-finder has, after long and searching experiments with all known models, finally approved the "Pavese," a reflecting instrument, alleged to require no base and no tables, about the size of an ordinary watch. The "Souchier" and "Parravicino" appear to have come next in merit. The average error of the "Pavese" is given at 0.5 per cent., and it is being manufactured by the firm of "Salmoiragki," at Milan.—*Militär Wochenblatt. No. 81.*

MILITARY MATTERS IN RUSSIA.

In the 3d guard infantry division stationed at Warsaw, a command of cyclists has been formed experimentally. The strength is 32 men; 8 men from each regiment, able to read and write, intelligent, strong, and of light weight. The command is under the chief of staff of the division, who has

under him two officers charged with the immediate instruction. The first regularly organized employment of this command as "flying post" is to take place during the manœuvres of this year. The exercises take place twice a week. Before the beginning of the manœuvres an experimental tour is to be made along the western frontier.

The adoption of the new infantry rifle has necessitated the introduction of new cartridge pouches. As the result of experiments the following has been decided upon: the privates of the active, reserve and ersatz infantry carry 120 rounds, 60 in two belt pouches, 30 in a breast pocket and 30 in a reserve pouch; the non-commissioned officers of these troops carry 60 rounds in two belt pouches, 30 in a breast pocket; non-commissioned officers and privates of engineers, local commands, and fortress artillery, 30 rounds in a belt pouch. An equal number of rounds for engineer troops is to be carried by the train. While all cartridge pouches form part of the regular field equipment, the left belt pouch only is worn on guard duty; whenever more than 30 rounds are to be carried, both belt pouches are worn.

When the whole Russian cavalry, with the exception of the guard, was converted into dragoons, the lance was done away with and left only to the Don, Ural and Orenburg Cossacks, and Cuirassiers and Uhlans of the Guard. This measure was, at the time, advocated with arguments by many authorities, among them Dragomirow, and there was an inclination to make fun "of the German 'Club Bearers' afraid to close with the enemy." Since the French have reintroduced the lance, the opinion in Russia regarding the lance seems to have undergone a change, and the advocates of "the queen of arms," among them quite weighty authorities, are making their voices heard, though cautiously, as for instance Ssuchomlinow in No. 156 of the *Invalid.—Militär Wochenblatt.* *C. R.*

The following are the more noticeable alterations made in the Russian regulations for the new rifle previously in force:

1. The limits of range at which firing is to take place have been extended, and they are fixed for individual practice of infantry and cavalry at 1000 paces, for collective firing of infantry at 2500 paces, and for cavalry at 2400 paces.

2. The practices with small targets are increased, and they are placed at further distances.

3. The marking of the hits after every shot only takes place at the first two practices at 200 paces, in the subsequent practices after every five rounds.

4. Practice ammunition is increased from 130 to 150 rounds.

5. Individual practices take place at 800 and 1000 paces. Cavalry have mounted individual practice at the halt.

6. Every man is required to judge distances up to 1000 paces.—*Von Löbell's Yearly Reports, Journal Royal U. S. I.*

FULGURITE EXPERIMENTS.

This explosive, the invention or discovery of the eminent chemist M. Pictet, of Geneva, is attracting a good deal of attention, and, if the claims for it are substantiated, it is a very wonderful substance. Three series of experiments have taken place at Thun, Friburg, and Lavaux. A copper cartridge charged with fulgurite No. 3,—for there are three varieties, differing in the proportions of their constituents,—placed upon the ground and fired by electricity, was driven deeply into the earth by the force of the explosion. There was no smoke, and, what was more remarkable, the body of the cartridge was cold, as the experts testified. The No. 3 fulgurite was also experimented with at Friburg for mining purposes, and its effects were described as slow and progressive, while Nos. 1 and 2 gave results that were *brisants*. The wooden blocks which supported the cartridges charged with these were pulverized at the top, and the cartridges themselves were blown into atoms, but here again there was no heating. The same explosives were used with powerful effect for rock-blasting. A singular feature is that detonation can be produced by no ordinary means, and at Friburg a powerful accumulator was used. The ballistic trials took place at Lavaux, No. 3 fulgurite being substituted for white, smokeless powder in the cartridges of the new Swiss rifle. Many experiments were made, with very remarkable results. While the initial velocity with the ordinary Swiss smokeless powder is 560 metres, fulgurite gave 668 metres, or 2202 feet. There was neither smoke nor heating nor fouling of the rifle. A singular phenomenon was also reported,—whenever the velocity exceeded 600 metres the ball appeared to be visible to the naked eye, a circumstance which M. Pictet attributes to the compression of the air, whereby oblique rays of light are refracted. A diffused light is said to be thus caused, giving the appearance of a white cup traversing the air. M. Pictet states that his explosive must be so constituted as to give a minimum pressure. For velocities below 450 metres it possesses this quality, the pressure being less than 500 atmospheres (3¼ tons per square inch); but with higher velocities the pressure is too great for the satisfaction of the inventor. He hopes in a further series of trials to gain a maximum velocity with a minimum pressure. The above is derived from a comparison of various foreign periodicals, all in substantial agreement, but chiefly from the *Army and Navy Gazette*.

CORDITE: EROSIVE ACTION.

The interesting trial between Mr. Nobel and the British government having been the means of definitely settling the question of property in the invention of cordite (in favor of the government), it seems probable that makers of explosives will soon be wanted to tender for large quantities of what may now be called the service (British) smokeless powder. The manufacture is a very elegant one, and comparatively free from danger, mainly on account of the absence of dust. The production of nitro-glycerine is, indeed, a highly dangerous process, but freedom from the uncertainty involved in the presence of dust renders the manufacture safe if the proper precautions are rigidly observed. Cordite has now been definitely adopted for the magazine rifle, and for all the quick-firing guns, and charges have also been

settled for some of the ordinary service breech-loaders, and notably for the splendid new naval 12-inch Longridge gun (wire-wound) which has just been produced in the Royal gun-factories. Although cordite has, up to this moment, been used only in the form of round cords varying in diameter from 0.0375 inch to 0.7 inch, steps are being taken to try other forms, such as square, hexagonal, oblong, and tubular. The latter form, which is produced exactly in the same way as lead pipe, was made as early as June, 1889, in small sizes, but is now being pressed out in large diameters. Cordite being of a horny and non-porous nature, burns exclusively on the surface of the cords, and with such regularity that, when not fully consumed in the gun, it is ejected, burned down sometimes as thin as a thread, but yet of uniform thickness. It is obvious, therefore, that the rate of combustion depends upon the relation between the volume and the surface, and that the tubular form offers great facilities for varying this relation without making the cord inconveniently thin.

A good deal of misconception exists as to the wear of guns using the new explosive. As far as can be made out up to the present, the erosion due to cordite for the same ballistics is not greater than that produced by the old powders, but the wear is of a different kind. It is confined to a few calibres length from the chamber, and is more of the nature of a smooth washing away of the metal than of the deep grooving and scoring which black powder produces. Cordite, however, gives much higher ballistics, and on that account it is not to be expected that the wear will be any less, and as the bore is left perfectly clean, the abrasion caused by the friction of the bullet in rifles (small arms) is necessarily more severe (than in the old models); but still it is found (?) that the wear due to cleaning and periodical lapping out is more destructive under service conditions than the actual firing. One enormous advantage which may be claimed for cordite, besides the absence of smoke, is its indifference to wetting, and safety as regards explosion in magazines and in cartridges unconfined in thec hambers of guns.—*Engineering, London.*

INVENTIONS AND EXPERIMENTS.

Russia is experimenting with observation towers for the direction of large bodies of troops, observation of the enemy's approach, effect of artillery fire, etc. From prepared material, 55 to 60 men constructed the tower in 20 minutes, in the absence of such material it required one hour with the same number of men.

Russia is conducting extensive balloon experiments with electric search lights of 5000 candle power. At an elevation of the balloon of 600 metres, a surface of 500 metres diameter could be overlooked, at an elevation of 150 metres 1 kilometre of road could be completely illuminated. More extensive experiments are to be made.

For all staff and superior officers of fortress artillery Russia has adopted a speaking trumpet, 365 mm. long to render a direct control practicable under the noise of gun fire.

Based on experiments, telegraph poles of Indian bamboo are to be adopted for the French military telegraph sections, since they combine light weight with great strength.

Hypophosphates mixed with chlorates make a mixture which resembles fulminate of mercury in its action, and, if specially prepared, that of nitroglycerine.

The submarine torpedo boat invented by Goubet in 1891 has been subjected to tests by a commission presided over by Admiral Gervais in Cherburg, and has proved habitable and stable at various depths. It passed repeatedly under armorclads. Two men and one gun find room in it.

In Peconing Bay experiments have been made with a new kind of Whitehead torpedo. The range of the torpedo is 731.5 m., with a speed of no less than 51.9 km.

According to Belgian experiments, captive balloons at an elevation of 2 km. are tolerably safe from hits by musketry, but not that of smallest calibre. A balloon of 450 cubic metres, fired at in France with 95 mm. guns at an elevation of 2500 metres, showed 98 per cent.; at an elevation of 7000 metres, 4 per cent. of hits. With the 120 mm. guns 98 per cent. of hits resulted at 2500 metres elevation, and 2 per cent. at an elevation of 9500 meters. Shrapnel proved the most efficient projectile against balloons provided the distance admitted of the use of this projectile. Balloons painted light blue were difficult to see and safer from being hit.

Dnring the manœuvres in Hungary and Galizia the Austrian cavalry regiments were provided with foot bridges 50 metres long and one metre wide, which, supported on four light canvas boats, rendered good service in the passage of rivers.

Captain Girolamo has had constructed two models of kitchen wagons, a four-wheeled one of cooking capacity for 1000 men and a two-wheeled one for 500 men.

Skoda of Pilsen has invented an automatic quick-firing gun with a flywheel. The latter is put in motion by the recoil of the gun, the force stored in it runs the gun forward again automatically, and performs all the functions necessary for keeping up an uninterrupted fire.—*Militär Wochenblatt. C. R.*

THE WOUNDED IN WAR.

The removal of the wounded from the battle-field to the places where they can receive surgical treatment, and the means sanctioned by regulation for carrying out this important work are matters of great importance. Some contend that the use of small arms of increased range and precision has tended to decrease the ratios of killed and wounded. This is clearly a fallacy, and it probably depends on the calculations being based on the ratios between the casualties and the total strengths of the armies present, and not, as they should be, on the ratios of the killed and wounded to the strengths of those portions of the armies actually engaged and under fire. For calculating the number of wounded with which the different units of the medical department will have to deal, and to enable us to form any accurate opinion as to whether or not the bearer companies and regimental bearer transport sanctioned by regulation will be capable of coping with the work required of them in these days of magazine rifles and Maxim and such-like guns, the number of men actually under fire must alone be taken into account. The medical units of this portion of the army will have to

do all the work of the removal of the wounded from the front to the field hospitals. The proportion between the wounded and the strength of those actually engaged is always difficult to be obtained, but an approximation may be arrived at, and it is the only data of any use to us for purposes of discovering whether or not the transport supplied by regulation will in future be sufficient for the requirements of the wounded.

It may be for use to us to consider how our own army stands in this connection. Putting the ratio of wounded at 10 per cent., an extremely low estimate, and one which has frequently been much exceeded, and supposing a division of the English army to be engaged, we should have 1000 wounded men to deal with. Of these, again taking a low figure, say 375 would be severely wounded and 625 slightly wounded; most of the latter might be able to walk to the collecting station. The 375 should be carried, and to do this work we shall have—or, rather, by regulation we should have—70 regimental stretchers, and 16 from the two bearer companies. The collecting stations could not be less than three-quarters of a mile in rear of the fighting line; the stretcher squads would therefore have to march one and one-half miles to the collecting stations and back; 86 stretcher squads would therefore be able to bring the 375 severely wounded to the collecting stations in a little over four journeys each, a march of about six miles. This, of course, would not be at all excessive labor. But is it to be depended on for a moment that the medical department will have 70 stretcher squads of two men each given over to it before an engagement begins? Will the general officer commanding the division deliberately weaken his fighting power by 140 men? But if he does not do so all the work of carrying the wounded must be done by the 16 squads of the bearer companies. In this case the squads would have to make 23 journeys, or 34½ miles. This, of course, is impossible, unless we admit that some of the wounded must be left unattended to on the field until the next day.

Then, again, the transport from the collecting stations to the dressing stations, and on to the field hospitals, would be carried out by the 20 ambulance wagons of the bearer companies. An ambulance wagon holds 12 men sitting, or one on a stretcher and eight sitting, or two on stretchers and four sitting; take nine as the average. All the 375 severely wounded and, say, 400 of the slightly wounded men would require carriage in this case, or 775 in all. Thus each wagon would have 39 men to carry to the field hospitals, and, at nine men per trip, five trips would be necessary. If the field hospitals were only three miles in rear this would mean 30 miles for each wagon team. Here again the transport of wounded must be spread over the greater part of two days. But as a matter of certainty all, or nearly all, of the slightly wounded cases would require carriage to the field hospitals; these latter could not be as near as three miles to the front, and, moreover, our estimate of 10 per cent. of wounded will be increased to 20 per cent. or more by the use of magazine rifles in the next great war. The above data are put at figures far too low, but taking even these it would appear that it will be impracticable to carry out the work required of the medical department as at present organized. The matter is a serious one, as all who have had experience of

warfare will recognize. Upon the proper disposal of the wounded the success of a campaign in these days largely depends. It is to be feared that our little wars have tended to create many false ideas, of which the importance of medical organization is one.—*The Army and Navy Gazette.*

NOTES FROM THE REPORT OF THE SMALL-ARMS PENETRATION COMMITTEE, 1893–94 (REPRINTED BY PERMISSION FROM THE "R. E. CORPS JOURNAL").

The above committee was presided over by Colonel T. Fraser, C. B., C. M. G., R. E., and the three rifles tested by it were the Lee-Metford 0.303 in. bore, with a bullet of 215 grains, sectional density 0.3346, specific gravity 10.484, and a muzzle velocity of 1975 to 2000 f. s.; the Mannlicher 0.256-in. bore, with a bullet of 160 grains, sectional density 0.3488, specific gravity 10.404, and a muzzle velocity of 2300 to 2400 f. s.; and the Martini-Henry 0.450-in. bore, with a bullet of 480 grains, sectional density 0.3386, specific gravity 10.916, and a muzzle velocity of 1270 to 1300 f. s. The cordite gave muzzle velocities sometimes differing by 100 f. s. The velocities of the Mannlicher fell off very much during the firing of 1000 rounds, owing to the erosion of the barrel. The Lee-Metford was not affected after firing 3000 rounds. The ammunition for the Mannlicher and Lee-Metford was about the same in bulk for 150 rounds, but those of the Mannlicher weighed 7.271 lbs., against 8.807 lbs. for the Lee-Metford.

The main advantage of the Mannlicher is the greater flatness of its trajectory, and consequently greater margin at the decisive ranges. Thus the 6-ft. margins at 1000 yds. are, for the Mannlicher 168 ft., for the Lee-Metford 156 ft., and for the Martini-Henry 82 ft. So long as the very small bullet now in use is effective against troops, the importance of this length of margin outweighs all other considerations. As regards accuracy of fire, when once the sighting was obtained the Mannlicher was very good, and was rather better at 1000 yards than the Lee-Metford.

Effect on Brick Walls.—The small-bore rifles easily penetrated a 9-inch brick wall with ½-inch boards at the joints, though the bricks resisted the bullets. At 100 yards the joint of a 9-inch wall and seven ¾-inch deal boards were penetrated, and at 400 yards some of the bullets penetrated the joints of the wall and two ¾-inch deal boards. At 600 yards the bullets passed through the joints of a 4½-inch wall and seven ¾-inch boards beyond, and at 400 yards bullets passed through the joints of a 14 inch wall and two ¾-inch boards.

At 200 yards 200 rounds breached a 9-inch wall so that a man could get through—the hole in the wall measured 24 inches by 15 inches. At the same range it took 1028 rounds, mostly in volleys of 50, to make a smaller breach in a 14-inch wall.

A wall with ⅜-inch joints of hard mortar was found to be practically impervious to the new small-bore bullets. Hence, brick walls for defenses should be 9 inches thick and have fine joints set in cement. It might be added that, for such a purpose, the bricks should break joint horizontally as well as vertically.

Two thicknesses of 2½ inches of bricks, breaking joint, placed between boards, was bullet-proof at 100 yards, though if several bullets strike the

same spot they pass through in turn, after smashing up the bricks. Thus, two rows of ordinary bricks, breaking joint, each brick having a thickness of 4½ inches, if kept between boards, will stop any bullets at all ranges.

Sun dried brick walls (as used in India) 18 inches thick, are bullet-proof, except after continued firing, such as 220 rounds fired in 11 volleys at 50 yards range. Curiously, in such walls the mean penetration increases gradually from 5 inches at a range of 3 yards up to 15 inches at 400 yards, and then slowly decreases, the reason of this being that at 3 yards range the bullets became spherical, at 50 yards the points became knots, while at 500 yards the shape was unaltered.

A wall, 9 inches thick, of burnt tiles set in mud, was penetrated at ranges between 200 and 900 yards by the small bores, but is safe against the Martini bullet. As in the previous case, the penetration increased with the range for some hundred yards. Volleys of 10 rounds were found to penetrate where single shots failed. This is probably owing to some of the bullets arriving in succession, the earlier ones preparing the way for those following. A similar 14-inch wall can be penetrated by a small-bore, especially at the joints. A 24-inch sun-dried brick wall appears to be quite proof a short time after the setting.

Fresh (green) mud walls require to be at least 4 feet in thickness to stop bullets at any ranges.

Penetration into Steel.—With mild steel or wrought iron a thickness of 0.44 inches is required for safety; but at ranges over 60 yards a 0.206 inch plate of hardened steel (weighing 8.75 pounds per square foot) will stop a Lee-Metford bullet. Against the Mannlicher, a ¼ (0.25) inch plate of hardened steel is required at short ranges; this is the plate recommended for sap shields. But at 500 yards a plate of hardened steel of less than 1-10 (0.088) inch, weighing only 3 pounds 10 ounces a square foot, resisted all the small-bore bullets; this plate is recommended for field artillery shields against musketry, if such be ever adopted, as artillery are not likely to engage infantry at ranges under 500 yards.

Penetration into Timber and Sand, Loam, Shingle, etc.—The new small-bore rifles with sheathed bullets have a much greater penetration than the Martini bullets at ranges under 1500 yards. At about 1500 yards the respective penetrations are about equal, while at longer ranges the Martini-Henry has a greater penetration. The shorter the range, and the harder the material, the greater is the difference in the results of the Martini-Henry and the small-bore rifles.

Against the small-bore sheathed bullets, green timber has only about the same resistance as dry. From the annexed table it is clear that at ranges much under 1000 yards timber baulks and standing trees will not generally offer much protection, except against ricochets, though at longer ranges they will suffice.

As regards sand, in firing at 3 yards the Mannlicher bullet, with its high muzzle velocity, smashed up, and so had but little penetration, and the Lee-Metford showed signs of smashing up. This points to a limit of muzzle velocity, beyond which any given bullet will be ineffective against sand cover. The penetration of the Lee-Metford into sand between boards is

less than 18 inches at any range. The penetration of the Mannlicher at the shorter ranges is still less, owing to the breaking up of its bullets.

A thickness of 3 in. of the large flint shingle of Dungeness between boards smashed up all the bullets, and stopped them penetrating, even at the shortest ranges; but a greater thickness of fine shingle was required to do so.

The new bullets penetrate 3½ ft. into moist tenacious clay at the shortest ranges, and 28 in. into loam.

A compressed cotton bale, 20 in. thick, end on to firer, was not penetrated by any of the bullets at 25 yds. range, though some penetrated when the bale was placed with its side to the firer. At 500 yds. the penetrations were 7½ and 13 in. respectively for each position of the bale. The Mannlicher bullets broke up before they had penetrated half-way.

The general result as to the penetrations with the new small arms seems to be that, with improved steel, the same thickness will suffice as with the Martini-Henry, though more is required with ordinary mild steel.

Timber, *per se*, is no longer of any use as cover at short ranges, owing to the great thickness required, and growing timber will no longer give the protection it does at present. On the other hand, a much smaller quantity of timber, in the form of boards, made into troughs or wooden boxes, or hurdle troughs with shingle or sand between, will completely stop the new bullets. Stockades of planks with sand, shingle, or dry brick cores will now replace the heavy timber baulks formerly used. In the absence of shingle, a few inches of the macadam of roads will supply the necessary core.

Not much alteration is required in sand parapets to resist musketry, but damp clay parapets must be considerably thicker, and those of loam must also be increased, unless a hard core is inserted.

A navy coal sack containing coal 12 in. thick is impenetrable.

Times of Flight.—As regards times of flight, the new arms are very superior to the Martini-Henry. Thus while with the Martini-Henry the bullets keep ahead of the sound of discharge up to about 800 yds., with the Lee-Metford and Mannlicher this occurs up to about 1600 yds. Up to 1500 yds., the Mannlicher has smaller times of flight than the Lee-Metford, but beyond that range the Lee-Metford has the smaller times of flight. This is a remarkable result, as the Mannlicher has the greater sectional density of the two rifles. This points to some air retardation, possibly skin friction, which increases relatively to the smallness of the bore.

A consequence of the smaller times of flights of the new bullets is, that at the longer ranges the new bullets are exposed to the influence of wind for a less time. Against this, however, is their smaller specific gravity, which diminishes slightly with the bore.

Extreme Ranges.—The greatest observed range (3760 yds.) was obtained with the Lee-Metford with 29° elevation, and a strongish rear wind, while on the same occasion 23° 45′ elevation gave a range of 3500 yds. But in a perfect calm, at sea level, a range of 3500 yds. was obtained with elevations varying from 27½° to 28½°. This shows that in the previous case the wind increased the range 250 yds. At 3000 yds. and over, wind is the dominating factor. On calm days 29° elevation gave 3575 yds., 32° gave a maximum of

3650 yds., 36° gave 3575 yds., and 45° gave 3350 yds. These statistics show that 4000 yds. is beyond the extreme range of the Lee-Metford under ordinary circumstances, but the bullet will kill up to the extreme range.

It was found that when the same range was obtained with different elevations, the times of flight varied with the elevations.

The extreme range of the Mannlicher could not be ascertained from the difficulty in hearing its bullet strike, but it is not considered to range as far as the Lee-Metford, because on the day that the Mannlicher required 15° elevation to range 3000 yds., the Lee-Metford only required 12° 17′ elevation.

Ricochet and Deflection Experiments.—At ranges under 100 yds., on a level surface of very smooth, hard sand, with the new bullets the mean rise was 1.3846 times the mean drop, while with the Martini-Henry the mean rise is double the mean drop.

On level turf, at 1000 yds., the mean rise of the Lee-Metford was about three times the mean drop; at 1500 yds., about 1.5 times; at 2000 yds. about twice, though many of the bullets on level turf did not rise, but entered the ground; at 2500 yds. 0.43 times, but only 5 per cent. of the bullets ricochetted off the turf, and these did not range more than 200 yds. from the strike; at 3000 yds. and over no bullets ricochetted off the turf, though there were a few ricochets off shingle at this range.

At 1500 yds., with the Mannlicher the mean rise was about 2.3 times the mean drop. No ricochets from turf were observed at 2500 yds. and over.

In these experiments most of the bullets which ricochetted appeared to upset.

On land, at short ranges, the deflections of the new bullets with a left-handed twist occurred both to right and left, the mean being only about ¼ as great as with the Martini-Henry, which averaged 1 in 100. The maximum observed deflection was only 1 in 114 to the right. With the Martini-Henry, all the deflections are to the right.

Angles of Descent.—The main advantage gained in the new small-bore rifles is the relative flatness of their trajectories, which are throughout very superior in length of margin to that of the Martini-Henry. At 1500 yds. the Lee-Metford and the Mannlicher have about the same drop, viz., about 1 in 10.4, after which the drop of the Mannlicher relatively increases. The drop was very much influenced by the strength and direction of the wind. This fact must be borne in mind in dealing with the recorded drops. However, for practical purposes, the following formula, due to Capt. C. F. Close, R.E., gives a fair approximation to the angles of descent of the Lee-Metford bullet between 1000 and 3000 yards range, viz.:—

$$\text{cot. angle of descent} = 1.4 \times 2\left(\frac{3000 - \text{range}}{500}\right).$$

MARINE ARTILLERY OF FRANCE.

The portion of this force in France is to be employed in war to *augment the army*. It is given a new organization by a decree of the 8th July, and formed into two regiments in France, and a number of batteries in the Colonies, the number and organization of which are left to the Minister of Marine.

The two regiments together have 6 field batteries, 4 mountain batteries, and 13 foot batteries, the total strength of which is 147 officers, 2742 men, 730 horses and mules. There are besides 5 companies of artificers, 21 officers and 643 men; and 1 laboratory company, 5 officers and 130 men.

In the Colonies there are 14 batteries and 1 detachment.

The battalions of fortress artillery are in future to be designated as battalions of foot artillery.—*Von Löbell's Yearly Reports. Journal R. U. S. I.*

FIRING PRACTICE FOR FORTRESS ARTILLERY.

The batteries which do not occupy cupola forts in Belgium executed two series of firings during 1894, one with 4 guns of 12c. model 1862, (32 shell and 8 shrapnel) and the other with 4 rifled mortars of a later model (32 shell of 15c, or 28 shell of 8.7c).

For the batteries charged with the defense of Forts Saint-Philippe, Rupelmonde, Berendrecht and Orderen, as well as for the service of the cupolas of Salient A of the Antwerp enciente, the first of these firings was replaced by one series with 20 shell of 12c. thrown from the 2-gun cupola just installed.

The batteries which garrison the forts at Liége and Namur and those which occupy Fort Schooten finished two firings from the cupolas (20 shell of 12c. and 40 of 5.7c.) and one series with 8.7c. mortars (28 shell).

One battery at a time fired with 6 guns of mobile position artillery, model 1862. During the first three periods of this firing they used guns of 12c. (40 shell and 20 shrapnel) and in the seven other periods, guns of 8c. (60 shell).

In France each foot battery disposed of 166 shrapnel of 8c. or 9c. in preparatory practice and in sea-coast practice at moving objects.

Each battalion received 248 rounds for 15.5c. guns (of which 144 were shrapnel, old form); 266 rounds for 13.8c. guns (of which 48 were shrapnel); 362 rounds for 12c. guns (of which 140 were shrapnel, old form, and 40 ring shell, new form); 150 rounds of 24c.; 102 rounds of 12c.; 252 rounds of 9.5c. (of which 94 were shrapnel and 32 ring shell); 144 rounds for 7c. or 5c. guns; 144 rounds for mortars of 27c., 22c. and 15c.; and 30 rounds for 22c., a total of 1698 shots.

It follows that each foot battery in France fires 424 shots annually.—*La Belgique Militaire. J. C. B.*

Reviews and Exchanges.

A History of the United States Navy.*

THE second volume of this work embraces the conclusion of Part 3 devoted to the War of 1812, and the whole of Parts 4, 5 and 6 covering minor wars and expeditions, the Civil War and the navy of to-day.

One of the most memorable actions of the early period was that of the *Wasp* and *Reindeer* as the comparative table shows.

	Guns.	Lbs.	Crew.	Killed.	Wounded.	Total.
Wasp:	22	309	173	11	15	26
Reindeer:	19	204	118	25	42	67

in a fight of nineteen minutes.

The result is described as due to the superior rapidity and precision of fire, the masterly handling of the ship and the magnificent discipline of the crew under Master Commandant Blakely.

Roosevelt states in his history, speaking of this vessel, that among the men there was not a foreign seaman. They were nearly all New Englanders and he adds: "During the whole war no ship was ever better manned or commanded." Her captain, Blakely, was born in Ireland and educated in North Carolina.

Subsequent to her encounters with the *Reindeer* the *Wasp* engaged and sank the *Avon* with a still greater disparity in the list of killed and wounded. She also captured some fifteen merchant vessels through one of which, returned as a prize to Savannah, came the last direct intelligence of her triumphant career. Her fate is one of the mysteries of the sea.

Note is made of a very singular coincidence from which it appears that the *Wasp* —first of the name—which captured the *Frolic* in 1812 and after her surrender to the British ship of the line *Poictiers*, was taken into the English service, is also supposed to have foundered at sea, "Never having been heard from since she left port for a cruise in the spring of 1814."

On the Lakes, Perry and Macdonough brilliantly atoned for the failure of the land forces due to the incapacity of paper generals and the constitutional scruples of State militia who were better posted in geography than tactics, until finally men like Scott, Brown, Jessup, and Miller forced their way to the front.

Of Macdonough, the hero of Champlain, Roosevelt too speaks in terms that deserve to be repeated: "His skill in seamanship, quick eye, readiness of resource and indomitable pluck are beyond all praise. Down to the time of the Civil War he is the greatest figure in our naval history."

He was twenty-eight years of age when he formed his line of battle off Cumberland Head and, as the English fleet came on, knelt with his officers for a moment's prayer on the quarter deck of the *Saratoga*—name of good omen for the approaching

*A History of the United States Navy. By E. J. Maclay, A.M. Volume II. New York: D. Appleton and Company. 1894.

fight. So pictured he might well replace on the national currency some of our more fabulous and less imposing landscapes.

But the whole matter of the naval war of 1812 can well be left where the London *Times* as quoted in the volume reviewed leaves it: "We have retired from the combat with the stripes yet bleeding on our backs. To say that the reputation of our maritime greatness has not suffered in the estimation of all Europe and what is worse of America herself is to belie common sense and universal experience. 'Two or three of our ships have struck to a force vastly superior!' No—not two or three but many on the ocean and whole squadrons on the Lakes, and the numbers are to be viewed with relation to the comparative magnitude of the two navies. Scarcely is there an American ship of war which has not to boast a victory over the British flag, scarcely one British ship in thirty or forty that has beaten an American."

This is the way history is written in the days when it is making, before apologists and theorists get hold of it and commence their deviltry of interpretation, whereby for instance we are now beginning to be told that in 1861 all the South wanted was—freedom, while the North lusted only for empire, slavery being wholly left out of consideration like a map of Africa with neither Nile nor Niger.

Part 4 treats of the war with Algiers, the Mexican War on the Pacific and Gulf coasts, the Japan and the Wilkes Exploring Expedition.

Twenty-five ships of the line is stated to have been Nelson's estimate of a force adequate to cope with the fleet and city of Algiers.

Decatur's squadron however consisted of ten vessels carrying two hundred and ten guns, and in the operations of little more than a fortnight he had secured as the result a treaty by which all claim to future tribute was relinquished and the prisoners in possession of Algiers were given up.

It was a suggestive outlook—that of the English at Gibraltar upon an American fleet bearing such names as the *Guerriere*, the *Macedonian*, the *Boxer*, the *Epervier*. The last of these passed out of the Straits homeward bound with Decatur's treaty and the ten liberated captives, but like the two *Wasps*, was never heard of again.

The very opportune if not devised presence of the American fleet in the Pacific and its active coöperation with Fremont secured that coast against both Mexico and a British occupation, always possible where good harbors and points of strategic value afford excuse for interference.

In the volume under review we are told of General Kearny's defeat at San Pasqual and that he was subsequently besieged in the vicinity of San Bernardino by the Mexicans from whom he was relieved by a naval force under A. F. V. Gray sent out for that purpose from San Diego.

This accomplished, Captain Stockton with six hundred men among whom were "General Kearny's sixty dismounted dragoons" marched upon Los Angeles.

Turning to the history of the Mexican War by General Wilcox we read that at San Pasqual after the attack upon Captain Moore the enemy were finally forced back and fled "not to rally again." When the march was resumed, the next day apparently, the enemy retired as Kearny advanced but "made a halt at San Bernardino, occupied a hill near and held it until attacked when they were driven off leaving five killed and wounded, the Americans suffering no loss."

Having been wounded at San Pasqual, General Kearny, so Wilcox says, remained at San Bernardino upon his surgeon's advice until the eleventh when he was joined by Lieutenant Gray and on December twenty-ninth General Kearny left San Diego for Los Angeles with dragoons, sailors, marines, and artillery while "Commodore Stockton accompanied the expedition." It is a little perplexing but the probabilities are

that these two accounts refer in the main to the same fact. It is the point of view only that varies as the spectator may be a dragoon or a sailor.

It is hardly to be expected that the saddle and the quarter deck should give the same horizon and we know that genuine history is noted for its discrepancies.

Exact coincidence proves nothing but collusion among the witnesses. Independent observation is always characterized by conflict of testimony, no two men having the same power of vision or faculty of dealing with inferences therefrom.

In the landing at Vera Cruz—still a valuable study for military men—the navy manned the surf boats, sixty-seven of them, already provided by General Scott—in his autobiography he says he caused them "to be built for this special occasion, each holding from seventy to eighty men"—and Commodore Connor added "a few cutters belonging to the larger war vessels," continuing the quotation from the autobiography.

In the recent life of Scott by General Wright he says in speaking of this undertaking that twelve thousand troops were put on shore by half past five in the afternoon of the day of embarkation "without a single error or accident."

The selection of Lobos Island about a hundred and twenty miles from Vera Cruz as the general rendevous for this expedition was also due to General Scott.

When some six months afterwards he took possession of the Mexican capital the marines were at the front, a detachment of them having fought side by side with the army up to the Belen gate.

The work of the navy from the opening to the close of the Civil War is told in the three hundred and fifty pages of Part 5, very concisely as might be inferred but very clearly. In this time the nation was raised "from one of the least to one of the greatest maritime powers of the world" and the annals of no navy furnish a more splendid record of how it was done.

There is little need to dwell upon any of the details. From the capture of Hilton Head to the sinking of the *Alabama* it is one glorious chapter of courage and capacity wherever the flag was in peril, whether from Confederate valor, the schemes of Napoleon or British malevolence.

For as the writer notes, speaking of Semmes' overthrow and flight, "England not only in this but in all other wars had so outrageously violated both the letter and spirit of international law that it is with surprise we find her offering a point of it as an excuse for not surrendering" the men stolen from the *Kearsarge* by the *Deerhound*, as to whose owner "one fact stands out above controversy that he was not actuated by any principle of international law whatever, of which he at that moment was densely ignorant, but was impelled by the general desire of all England to see the United States divided and thus become a less formidable rival to Great Britain."

For "all England" we would rather read that portion of it so touchingly alluded to in the lines:

> "Let commerce, laws, and learning die,
> But spare—oh spare our old nobility."

As on the *Saratoga* half a century earlier, here also—for it was a Sunday morning when the *Alabama* came out and on board the *Kearsarge* the men had been inspected and dismissed to attend divine service, "Captain Winslow put aside his prayer book and seizing the trumpet ordered the decks cleared for action"—that action in which a sailor mortally wounded and taken below, while lying on his mattress, "whenever the cheers of his shipmates were heard, with difficulty waved his hand over his head and joined in each cheer with his feeble voice."

Part 6 is devoted to the navy of to-day with chapters on "Minor Services," though under this heading we find such well remembered episodes as the Koszta incident and

Commander Ingraham, the Canton forts and Commander Foote, the Peiho River and Captain Tatnall and the disaster at Samoa—if that can be called disaster where the men meet the tempest as they would the enemy and with the music of national airs swelling over the wild tumult of wind and sea.

Chapter two treats of the development of the navy. James K. Paulding when he was Secretary appears to have been almost as conservative as Dr. Lardner himself. Opposing the introduction of steam, "I never will consent," said the patriotic Secretary, "to see our grand old ships supplanted by these new and ugly monsters."

And there are always officers of the "old school" like the captain quoted who was dubious about the "new fangled shell guns." The division officers, he says, hardly knew "whether the fuse went in first or the sabot or whether the fuse should be ignited before putting the shell in the guns."

Then came Ericsson, propellers, monitors, armor plates. built-up guns, and finally the famous White Squadron. Appendices give a classified list of the present navy and the Roll of Honor of seamen who have won medals for bravery in action.

This closes the history to which no higher praise could be given than to say that it is altogether worthy of the subject described. H. W. C.

The Association of Military Surgeons.*

The Fourth Annual Proceedings of this Association is a large octavo volume of nearly 800 pages. Besides the proceedings, proper, there are printed in full, forty papers. All the contributions are valuable ; but owing to our limited space we shall refer only to such as have a practical bearing on military surgery, and only to the more important of these.

The opening paper by the president, Col. Nicholas Senn, Surgeon General, N. G. Illinois, treats of "Abdominal Surgery on the Battle field." To many, no doubt, particularly to those who have seen service in war, "laparatomy on the battle-field" may appear impracticable. But Col. Senn's article will leave the reader with higher hopes. The author seems to realize fully the difficulties to be overcome and he does not expect to make a skillful laparatomist out of every surgeon, but he shows good grounds for believing that we may yet hope to cut open the abdomen and tie its bleeding vessels at a station close to the line of conflict.

"A Symposium on Transportation of the Sick and Wounded," consists of nine papers. The first of these, by Major Charles Smart, Surgeon, U. S. Army, is a scholarly historical essay on "Transportation of Wounded in War." In the countless ages of conflict through which our race has passed up to the close of the last century, it appears that no organized system was known, or at least none is recorded, for rescuing the wounded soldier on the field and carrying him without delay to the rear. The *ambulance volante* was devised by Baron Larrey only about a hundred years ago. "Its first service demonstrated its value."

Major V. Havard, U. S. Army, discusses "Litter and Ambulance Transportation" in a practical manner. He favors the use of individual slings for the litter. Here is a remark on the ambulance which we regard as a very mild statement of the case. "The removable seats * * * are always a source of trouble and bad temper." We believe that the packing and preparing of these seats are often the causes of more silent profanity than anything else in our drill—profanity which would be very audible if no officer were present.

"The U. S. Army Ambulance, its Advantages and Defects, as Shown by Actual Service," is the title of a paper by Capt. James D. Glennan, Asst. Surgeon, U. S. Army.

* *The Proceedings of the Fourth Annual Meeting of the Association of Military Surgeons.* Edited by the Secretary, Lieut. Col. E. Chancellor. St. Louis, 1894.

We agree with him in all his strictures, yet we doubt if an ambulance ever will be constructed which will meet perfectly all the requirements of the service, unless these requirements change greatly. In securing one advantage we sacrifice another. Capt. Glennan says: "The method of securing the seats, when prepared for use is good, but the slot at the hinge end of the upright support should be cut entirely through the floor, so that it cannot be clogged with dirt." Yes, we have found this clogging a serious annoyance during drill on muddy ground, and the remedy would be easy if permitted.

In his essay on "The Travois—a New Sanitary Appliance in the First Line of Battle-field Assistance," Major John Van R. Hoff, Surgeon, U. S. Army, describes and depicts different forms of traveaux and gives us a proposed travois drill. But the chief interest of his paper is his prediction as to the future use of the travois. Heretofore it has been thought serviceable only "for transporting sick in countries or under conditions where the use of wheeled vehicles or other means of transportation is impracticable"; but Major Hoff believes that it may be used profitably on any battle-field and that, in some cases, it possesses advantages over the hand-borne litter and the ambulance wagon.

Col. Louis W. Read, Surgeon General, Pennsylvania National Guard, gives in a treatise of six pages, a satisfactory description of "Railway Transportation of Sick and Wounded," during our Civil War.

Medical Director Albert L. Gihon, U. S. Navy, speaks as one with authority on "Transportation of Sick and Wounded on Board Ship." The article is well illustrated, and must prove of value to army surgeons who are often called on to ship their sick and wounded. He particularly describes the naval ambulance cot of his own invention.

"A Field Hospital Kitchen Wagon, for Sterilizing Dressings and Cooking Food at the Dressing Stations and on the March," is described and figured by Capt. H. O. Perley, Asst. Surgeon, U. S. Army. We do not learn from the paper that this particular form of wagon has been manufactured or put to the test of practical use, although there is nothing novel in the idea of a kitchen wagon, or in its employment with armies.

The subject of litters receives considerable attention in this volume. Capt. F. J. Ives, Asst. Surgeon, U. S. Army, describes "A Litter for Military Use," apparently of his own invention, with handles of bamboo and he advocates its employment on account of "cheapness, lightness, simplicity of construction and compactness." Lieut. Col. Woodhull, in an article to be described later, suggests the trial of bamboo in hand litters. Captain Ives' litter has no legs. Capt. Myles Standish, in an instructive article on the "Organization," etc., "of the Massachusetts Volunteer Militia," described a litter used by that organization which has many advantages, but is (to his regret) devoid of legs. In other papers, short, fixed legs are favorably spoken of, and the long folding ones, once in favor, summarily condemned. We fear that all this indicates forgetfulness of past experience. It was not from mere conservatism or unconquerable stupidity that the surgeons of our late war used litters with long legs. Our militia manœuvres are carried on in favorable seasons. Our out-door litter drills, in the regular service, are usually conducted on selected ground and in dry weather. Deep, soft mud is a thing we are not obliged to consider. Real war makes no choice of ground or season. In the deep, red mud of the old Virginia battle-fields, or in the swamps where many a struggle took place, legless or short-legged litters would have been worked at great disadvantage. We have tried, for experiment, the present litter (to the intense disgust, no doubt, of the hospital men who had to clean it for the next inspection) on very soft mud, and have witnessed the difficulties of which we speak.

The "Notes on the Introduction of Tent Field Hospitals in War," by Col. B. J.

D. Irwin, M. D., Assistant Surgeon General, U. S. Army, are chiefly historical; but while telling his story the author continually impresses on his reader the important lesson, largely derived from his own wide experience, of the value of tented hospitals in time of war and their superiority over hospitals established in permanent dwellings.

The character of the article by Christopher J. Cleborne, M. D., Medical Director, U. S. Navy, is well set forth by its title, "Brief Notes on Ship, Hospital, Barrack and Camp Furniture, and on Electric Heating and Cooking." It describes modern novelties and improvements in these things. He favors the use of electricity for hospital cooking and the employment of aluminum utensils.

The remarks of First Lieut. Charles William Galloupe, Assistant Surgeon, Mass. V. M., on "Diet of the National Guard at Summer Encampments," lack nothing in interest or instruction by being humorous. He gives us three militia names for Seidlitz powders; "seedless," "settlers," and "settlin's." His organization seems to be ignorant of the appropriate Regular Army name of "sutler's powders." His paper ends with some valuable conclusions, the first of which is "Sickness in summer camps is due principally to injudicious diet."

Capt. James E. Pilcher, Medical Department, U. S. Army, discusses "The Place of Physical Training in the Military Service." He sets forth the advantages of such training and states briefly the principles on which it should be conducted.

Dr. Robert Reyburn, late Surgeon and Brevet Lieut. Col., U. S. Vols., gives us some practical and "Easy Methods of Carrying out the Principles of Aseptic Surgery." He believes that under most circumstances the elaborate technique commonly advocated is as impracticable as it is unnecessary, and he presents a few "maxims" which sum up his system of treatment. Dr. Reyburn shares in the lack of confidence which has of late been growing with the profession in regard to corrosive sublimate and other favorite surgical antiseptics. Perhaps in "Trikresol" we have a germicide which will supplant these. Major Walter Reed, Surgeon, U. S. Army, furnishes a paper, in which he calls attention to this substance. One great advantage it is said to possess is that albumen does not interfere with its germicidal action. Its properties have, however, so far, been studied more in the laboratory than in the hospital.

Some excellent suggestions are made by Capt Charles F. Mason, Assistant Surgeon, U. S. Army, on the "Equipment and Instruction of Sanitary Soldiers of the U. S. Army and National Guard." We approve of most of these suggestions, but there is one on which we crave further information. He says, "Let the position of company bearer be one of the rewards of merit." How is this to be done in our army in time of peace? Occasionally a man is found who likes the drill; but the average soldier regards it as an irksome addition to his duties for which he receives no reward. We wish we knew how to persuade him to the contrary and make him strive for the position.

Assistant Surgeon George D. DeShon, U. S. Army, in his discussion of "The Personal Equipment of the Sanitary Soldier," gives some good reasons why the weight which said soldier must carry on the march should be greatly reduced, and tells us how he thinks this may best be done. He objects to the Hospital Corps pouch now issued and recommends a belt to be used instead.

The sanitary services in foreign armies are chiefly considered by three writers, Colonels Greenleaf and Woodhull and Major Hoff.

The paper by Col. Charles R. Greenleaf, Deputy Surgeon General, U. S. Army, is entitled, "The Medical Officer at the Summer Encampment," and is devoted to describing manœuvres which he witnessed in the Medical Department of the French army, and drawing from these lessons of value for our own service. These manœuvres —a most perfect and ingenious mimicry of war—are graphically escribed.

The army sanitary services of the five great powers—France, Germany, Austro-Hungary, Great Britain and the United States, are considered by Major John Van Rensellaer Hoff, Surgeon, U. S. Army, in his "Outlines of the Sanitary Organization of Some of the Great Armies of the World." He devotes but 15 pages to the French army, but speaks highly of its system, while he devotes 34 pages to the army of the United States, without holding it up for special admiration. He closes by saying: "Contrasted with the almost perfect sanitary organization of other armies, our own unpreparedness in this direction points a moral we can ill afford to ignore."

"Observations on the Medical Department of the British Army—Abridged from an Official Report of Observations Made in 1891," is the title of the paper by Brevet Lieutenant-Colonel Alfred A. Woodhull, Major, Medical Department, United States Army. If the author had not assured us in the title and elsewhere that this is an abridgment we should have thought it an exhaustive treatise, so fully does it satisfy our curiosity, besides answering many questions we would never have thought of asking. Nothing seems to have escaped the inquiring mind of the writer. He makes many interesting comparisons between our methods and those of the British, in which, as in drill for instance, he finds we have often the advantage.

It is to be expected that the recent improvements in firearms and ammunition should occupy a large share in the anxious thoughts of military surgeons, the more so as the presumably most deadly of the new weapons have not yet been tested in battle, and their effects have so far only been studied on the lower animals, on dead subjects, on target dummies and other things that "can't shoot back." The air is full of prophesy and painful expectation. Many writers in this volume make some reference to these weapons and their possible effects, while four essays are devoted altogether to their consideration.

The essay of Lieutenant-Colonel William H. Forwood, Deputy Surgeon General, U. S. Army, on "Weapons of War, Illustrated with Examples of Modern Small Arms, Projectiles and Smokeless Powder," although the last in the book might properly precede other papers in this line, since it is devoted to the study of the ordnance, not to the lesions produced. He gives a brief review of the evolution of the modern rifle from the first introduction of firearms into warfare to the modern small calibre magazine rifle, with its steel-cased bullet and smokeless powder. "Our own government," he says, "has been somewhat slow to adopt the new weapon, but by waiting we have lost nothing and gained many advantages from the experience of other nations."

In his paper on "Field Work of the Hospital Corps as Affected by Modern Projectiles," Major Henry S. Turrill, Surgeon, U. S. Army, describes many modern projectiles, particularly the new Frankford Arsenal shrapnel. As the results of his observations at target practice and in the exercises of the school of application at Fort Riley, he reaches the following discouraging conclusion: "I found that * * * when under fire of shrapnel, if in actual combat the same conditions of accuracy and rapidity of fire should obtain as was shown in target practice, no force of sanitary soldiers could pass that region of death of three hundred yards in rear of battle-line; and that all work over this danger space would have to be suspended until firing by the artillery had ceased, and all work of care of the wounded would have to await the result of the engagement and the cessation of the shrapnel fire."

The title of the paper by Major Alfred C. Girard, Surgeon, U. S. Army, "The Latest Experiments on the Effect of Small Calibre Rifles," sufficiently indicates its character. A sub-title informs us that it is a résumé of experiments performed in Europe. It is profusely illustrated. He also reaches a conclusion which affords little comfort to the philanthropist unless it helps to confirm him in the oft expressed

hope that war will eventually become so terrible that it will have to cease and give place to "the parliament of man." "It is evident * * * that the more humane effect of the modern small calibre rifle with high velocity is unfortunately a myth, and that, with the possible exception of slighter muscular injuries, we will have in the future to encounter more severe injuries to the bones, and on account of its greater range, a greater number of injuries."

Surgeon Henry G. Beyer, U. S. Navy, in his practical and instructive article on "First Aid on the Battle-field," considers the effect of the new rifles on the future of first aid. He believes that hermetic sealing of the wound will be the usual treatment adopted when the new bullet comes into use in battle, for the missile, it seems, has a way of passing through its victim and not troubling the surgeon to extract it. Much will depend on the efficiency of the first-aid man.

It has fortunately fallen to the lot of Dr. Charles H. Alden, Assistant Surgeon General, U. S. Army, to prepare an address on the subject of army medical schools for this volume. The subject is concisely but thoroughly treated in his paper on "The Special Training of the Medical Officer with Brief Notes on Army Medical Schools Abroad and at Home." As president of our Army Medical School, he is peculiarly fitted for the task. We learn from him that such a school was contemplated in this country in 1863 by Surgeon General Hammond and was about to be organized, but thirty years elapsed before a similar scheme took shape under the direction of Surgeon General Sternberg. There are some thirteen nations, including Mexico, Turkey and Japan, which have army medical schools, and we are last on the list—a fact which, as the author says, "may well excite surprise." During its first session the value of our school was proved beyond all question. Already the profession has begun to look forward to using it for the instruction of the National Guard. Capt. Clark, Asst. Surgeon, N. G. Minnesota, in his paper before quoted, suggests that the privileges of our Army Medical School be extended to members of the National Guard, and Col. Alden hopes for a National Medical School for all services. "But for this we must wait." How long?

W. MATTHEWS.

Following the Greek Cross, or Memories of the Sixth Army Corps.*

Few of the books in which are recorded, more or less fully, the achievements of the corps into which the Union army was divided during the Civil War, are written with such ease and fluency as General Hyde's "Memories of the 6th Army Corps."

It does not claim to be a corps history, yet it furnishes a foundation upon which a corps history might readily be written. The marches, battles and various vicissitudes, may be traced therein from the time of its organization as a corps until it passed before the President of the United States—no longer so in name only—in its final review in Washington.

The reader, especially if he wear the button of the Grand Army or Loyal Legion, will not lay the book down until the last leaf is turned.

The General expresses his opinions freely as he carries his narrative on, and many of them are of interest to all who fought in that war, even if they cannot agree with the writer.

Speaking of the first commander of the Army of the Potomac he says: "McClellan, though no commander ever had the love of his soldiers more or tried more to spare their lives, never realized the metal there was in his Grand Army of the Potomac. * * *

* *Following the Greek Cross, or Memories of the Sixth Army Corps.* By Thomas W. Hyde, Brevet Brig.-Gen. of Volunteers. Houghton, Mifflin and Company, Boston and New York. 1894.

He was troubling his patriotic and gallant heart about the troops that had been taken from him, and never appreciated until too late what manner of people he had with him."

Referring to the almost irresistible desire to be with one's own comrades in times of danger, which all who were in the armies on both sides can remember and appreciate, he says, that when he was in hospital near Savage Station "* * * the cannon began to boom in the direction of our camp. I bore it awhile but could not stand it long; was helped on my horse and before I got to camp again, where the cannonade of Golding's was going on, I was well and in my right mind. Now this was not from any special anxiety to get into the fight, for I do not think that we had that very much, but the longing to be with the other fellows came over one like a kind of fascination. * * * I must say, however, that this desire weakened as the years went on. Though I was badly scared in every fight, I think it grew on me, and I was more scared in the last fight than in any other." The General here refers to the feeling just preceding the fight, which disappears when once the engagement is on, particularly if one has any responsibility upon his shoulders.

His last actual fight was the final storming of the enemy's lines at Petersburg, he being then a colonel commanding a brigade. Then followed the march in pursuit and the surrender at Appomatox. "To our momentary disgust and to Grant's honor we were, the next day, refused a sight of the Southern army. How mad we were, and how unjustly. We did not want to exult over them, but we were curious. * * * They were spared what might have seemed to them a humiliation."

In speaking of the final attack on Petersburg, he says:

"The 61st Pennsylvania had about 500 men that day; 200 of them old men, and 300 drafted men, substitutes, and the like. As we started the charge, the 300 of the latter disappeared and we never heard of them afterwards, but the 200 old men took two of the five colors captured by the brigade. The 200, in my opinion, should all have large pensions, and the 300 should all have been shot or hung. It would be interesting to know how many of the latter lot in after days turned up to be pensioned by a grateful government. * * * "

The book is not an expensive one; that it is from the Riverside Press of Cambridge is proof of its fair appearance; and it is illustrated with a dozen portraits and a few scenes of the war. It is well worth purchase and perusal. W. L. H.

Loebell's Annual Reports on Changes and Progress in Military Matters.—1893.*

The present volume is the twentieth of the series and edited by Lieutenant General Jarotzky, retired, who, however, was not to see the appearance of the work as he died before the event. The book is a large octavo with 560 pages and a veritable military-statistical and military-scientific encyclopædia. Like its predecessors, the work is divided into three parts; in the first part are contained reports on the armies of the different states, in the second reports on the several branches of military science, while the third is historical and contains a necrology.

The armies reported on in the first part are those of Germany, Belgium, Bulgaria, Denmark, France, Greece, Great Britain, Italy, Montenegro, Netherlands, Norway, Austria-Hungary, Portugal, Rumania, Russia, Sweden, Switzerland, Servia, Spain, Turkey, and the United States. These reports begin with tables showing the composition of the army, the corps, etc., and the organization in general, number of officers and men in each branch of the service, etc. Changes made by legislation, appropriation

* *Loebell's Annual Reports on Changes and Progress in Military Matters.—1893.* By the late Lieut. Gen. Th. v. Jarotzky. Mittler, Berlin, 1894.

bills, changes in armament, equipment, garrison, etc., are then stated. If we pick out one of these reports at random we find 30 pages, for instance, devoted to the Russian army which is treated under the following headings :

I. Strength and Composition of the Army.
   A. In peace.
      Composition ; strength.
   B. In War.
      Composition ; strength ; effectives of the severel branches of the service in peace and war.

II. Organization.
   Formation of new reserve brigade commands. Combination of Plastun Foot Battalions into a brigade. Disbanding of a Kuban Cossack Brigade. Troops in Trans-Caspia. Troops in Eastern Siberia. Organization of the trains of the Russian army. Reorganization of the frontier guards.

III. Formations.
   Formation of two siege artillery battalions.

IV. Recruitment.
   Recruiting. New Recruiting Regulations. Changes of the recruiting regula ions in the Caucasus.

V. Remounts.
   Progress of horse breeding in the Terek district. Inferiority of the Ural horses.

VI. Matters concerning officers and non-commissioned officers.
   Officers. Promotion of Lieutenants to staff captains and captains. Examination of the reserve officer. Non-commissioned officers. Their number.

VII. Mobilization.
   Process of calling out the men at mobilization.

VIII. Training.
   a. Summer training : General matters ; exercises of men and officers of the reserve ; participation of the cavalry in the special concentrations ; artillery exercises ; sappers ; frontier guards ; Cossacks of 2d and 3d categories ; field firing ; swimming of rivers ; use of velocipedes ; experiments with balloons.
   b. Marching exercises and manœuvres in winter.
   c. The exercises in the camp of Krassnoe-Selo.
   d. The grand manœuvres of this year at Krassnoe-Selo.
   e. The new firing regulations of the new Russian rifle.

IX. Clothing and equipment.
   Clothing of the Opoltschenie ; new uniform of the Cossacks ; experiments with Pelham bits in the regular cavalry ; defects of the cavalry saddle ; probable reintroduction of the knapsack in the infantry.

X. Miscellaneous.
   Appropriations for 1894.

The second part of the work begins with the tactics of infantry the subject being introduced with the discussion of the question "is there such a thing as a separate tactics for infantry?" The prevailing tactical tendencies of Germany, Austria, France, Russia and Great Britain are then presented and questions and writings discussed.

Cavalry tactics are next taken up and treated in like manner.

The subject of field artillery tactics begins with a discussion of the field gun of the future, the light quick firing gun and the field howitzer. Innovations in this branch of the service in the several armies are then taken up.

Then comes the subject of fortress warfare followed by a long article on small arms, dealing with all the small arms, firing regulations, etc., in the several armies.

The next report is on artillery matériel, field, fortress, siege and sea-coast guns, raw materials (nickel steel and aluminum bronze) and high explosives. Innovations in the several armies are then cited and the article closes with a report on private manufacturing establishments and artillery literature.

Much space is given to the report on permanent fortifications, which, among other very interesting things, gives a lengthy report of the French fortifications along the northern and eastern frontier of France, the most detailed report on that subject that we have seen in print.

The article on the pioneer service is also a lengthy one and deals with :—

1. Field fortifications and latest regulations issued on the subject.
2. Exercises of technical troops.
3. Organization of the technical troops in twelve different armies.
4. Military bridges and expedients for crossing rivers.
5. Miscellaneous.

Next follow reports on military ballooning, carrier pigeons, military education and educational institutions, and military historical literature.

The third part of the book contains historical sketches of :

1. The battles in the German-African territories in 1892–93.
2. Expeditions against the Arabs in the Congo Free State.
3. Second expedition against Dahomey.
4. Battle of Agordat between Italians troops and the Dervishes, Dec. 21, 1893.

The work terminates with a military necrology of the more noted chiefs who died during the past year, giving a brief record of each. Among the names enumerated those of Generals Beauregard, Butler and Kirby Smith are the more particularly familiar to us. Other names in the distinguished list are those of Count Auersperg, Euelsheim (the great Austrian cavalry leader and authority on cavalry matters), Miribel, late chief of the French General Staff, MacMahon, Kamecke, von Versen, etc.

If German military literature possessed nothing else attractive or interesting, this work alone would suffice to make every officer, desirous of keeping informed of the doings of the military world at large, wish to acquire at least a reading knowledge of the German language. The entire series of these Annual Reports should occupy a prominent place in every military library.

CARL REICHMANN, 1st Lieut. 9th Inf.

The Special Training of the Medical Officer.*

Colonel Alden's interesting address calls attention to the organization of the Army Medical School at Washington, D. C., and to similar schools existing in many of the armies of the world.

The nations of the continent of Europe which from their establishment had been engaged in war, early learned the necessity for a trained body of medico-military officers ; and special schools for their instruction were organized in France as far back as 1718, in Prussia 1719, in Saxony 1748, and in Austria in 1784. Great Britain whose insular position protected her from the ever present fear of attack, and whose wars were for the most of minor character failed to appreciate the necessity for so complete a sanitary organization, until the breakdown of her administrative services in the Crimea taught her the lesson. In 1860 a school was organized at Chatham for the

* An address delivered before the Association of Military Surgeons of the United States, at Washington, D. C., May 3, 1894. By Dr. Charles H. Alden, Assistant Surgeon General, U. S. Army.

training of medical officers which, three years later, was removed to the Royal Victoria Hospital, Netley, where in the language of our author, it has attained "a world-wide reputation from the distinguished lecturers and writers, Aitken, Parkes, Longmore, McLean, and others who have been connected with it"

We inherited our military organization, regulations, and customs of the service from the English, and it is not strange that we accepted their ideas regarding sanitary organization, and the sanitary officer, but they profited by misfortune and to day have perfected an admirable sanitary corps, complete in all its parts. We, too, are reaching out to this end, but before its accomplishment we must learn to appreciate the fact, so well stated by our author, that the medical schools of our country do "not supply the special training the army surgeon needs for his work. * * * Unfortunately the idea seems to linger in the minds of a few people that all the military surgeon has to do is to sit in his quarters and wait until somebody gets sick or hurt, that as none but sound men are enlisted there cannot be much need for his services; or even that in case of a march or fight it is only necessary to engage the nearest civilian physician and take him along. It needs, however, but a little reflection on the part of intelligent men to see that the medical officer has demands upon him other than those of the practitioner settled in a civil community."

Colonel Alden gives a very interesting résumé of the workings of the various foreign schools, and concludes with a description of our own which encourages us to believe that though last at the start we will not be distanced in the race.

The school will unify opinion, consolidate the medical corps and make it in its singleness of purpose a much more efficient body than it has heretofore been. At present its facilities are open to the regular establishment only, can we hope that they may in due time be extended to the medical officers of the National Guard as well?

J. V. R. H.

A Text-Book of Modern Spanish.*

If any apology were needed for noticing a Spanish text-book in a service journal, it could be easily found in the fact that Spanish is with us, in a certain sense, an official language. We study it in our national schools for the same reason that the German officer studies French or Russian, or the French officer, German or Italian: it is a language we may some day be called upon to use in service. As long as this possibility exists, just so long will Spanish have for us an official interest, quite apart from that growing out of its intrinsic beauty and strength.

Mr. Ramsey's text is therefore opportune: he has written the best grammar of the Spanish language to be found in English to-day. The officer who wishes for professional reasons to extend the necessarily limited course of the Academy, will find in the work under notice all that is necessary for as complete an understanding of Spanish as may be had out of Spanish-speaking countries. And at the same time he will find his knowledge of it as an instrument for the expression of human thought, both strengthened and deepened.

The author has divided his work into three parts. The first treats of orthography and pronunciation, and gives the new accentuation fixed upon by the Spanish Academy in 1888. And here we may note, that, so far as we are aware, this new system is given in no other text-book written for English-speaking peoples. Part II. (pp. 18-106) contains twenty preliminary lessons intended to familiarize the learner with the commoner forms and principles, and to furnish him with a foundation for the broader

* *A Text-Book of Modern Spanish*, as now written and spoken in Castile and the Spanish-American Republics. By Marathon Montrose Ramsey, B. S., Instructor in Spanish and Italian in the Columbian University. New York: Henry Holt and Company. Pp. xi., 653.

treatment of Part III. (pp. 107-590). An appendix (pp. 591-620) describes social and epistolary usages, and gives a list of derivative geographical adjectives.

These parts are in no sense independent of one another. On the contrary, the care of the author has been throughout to make his book progressive from cover to cover. All grammars aim at this, and certainly all claim that they do. But in the case before us, this claim is justified by being made good in a manner that will satisfy the most exacting.

Certain features distinguish this text from others on the same subject. The division between forms and syntax is broken down and the two are treated together from the beginning. The advantage of this is obvious: the student at once begins to apply what he has learned. It is easy to see from this that Mr. Ramsey's treatment of the subject is both philosophical and practical: his book is as much a working grammar as it is a grammar of reference. There is to be sure, nothing novel in this; still it is this one general feature that distinguishes it from Knapp's text, and no other is worthy of mention in comparison.

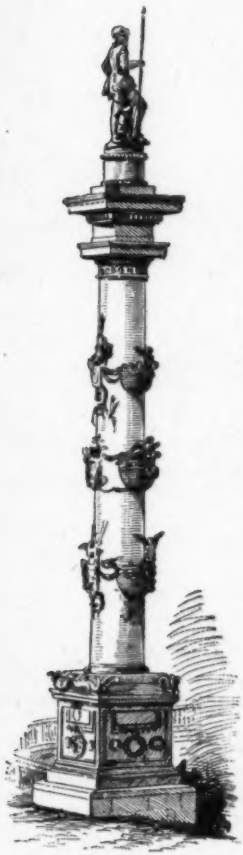
Several other characteristics may be noticed. The lesson on words common to Spanish and to English is as interesting as it is valuable: the same may be said of forms of address (p. 80). Certain distinctions hard to seize are fully illustrated and explained: for example that between the imperfect and the aorist—the author has revived this name; and again, that between *por* and *para*. Verbs are treated as fully and as thoroughly as they are in Knapp; and this is high praise. The subjunctive receives fuller consideration than is bestowed upon it in any other similar text-book. The chapter on word-making by derivatives is one of great value; it gives the student the power of seizing many of the finer shades in the meaning of words. The exercises are admirable; the tediousness characteristic of this element of language text-books has been successfully avoided, and the student who goes carefully through the exercises will find that he has acquired a real hold upon the language.

Space is lacking for further mention of the many excellences of Mr. Ramsey's work. He is to be congratulated upon his labors, for he has produced a text-book that has no superior in its field, and that is a distinct credit to American scholarship.

C. DeW. W.

XUM

Neptune's Lofty Vigil.



The god of the deep is sleepless. From his lofty column he scans the wonders of the Fair. The inland sea, a thousand miles away from his domain, unfolds its myriad beauties to his view. Upon the shore, where dash the ocean's waves, sublimer spectacle never met his gaze than here his eyes encounter.

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Prize Essay—1895.

I.—The following Resolution of Council is published for the information of all concerned:

Resolved, That a Prize of a Gold Medal of suitable value, together with a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest; the subject to be selected by the Executive Council and the Prize awarded under the following conditions:

1. Competition to be open to all persons eligible to membership.

2. Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary *on or before September* 1, 1895. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.

3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate *the Essay deemed worthy of the prize;* and also in their order of merit those deserving of honorable mention.

4. The successful Essay shall be published in the Journal of the Institution, and the Essays deemed worthy of honorable mention shall be read before the Institution, or published, at the discretion of the Council.

5. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held Nov. 9, 1894, for the Prize Essay of 1895, is

"*THE ART OF SUPPLYING ARMIES IN THE FIELD AS EXEMPLIFIED DURING THE CIVIL WAR.*"

III.—The gentlemen chosen by the Council to constitute the Board of Awards for the year 1895 are:

GENERAL J. C. DUANE, U. S. Army.
GENERAL S. B. HOLABIRD, U. S. Army.
GENERAL J. W. BARRIGER, U. S. Army.

J. C. BUSH,
Acting Secretary.

GOVERNOR'S ISLAND,
January 1, 1895.

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* "All officers of the Army and Professors at the Military Academy shall be entitled to membership, *without ballot*, upon payment of the entrance fee. Ex-officers of the Regular Army of good standing and honorable record shall be eligible to full membership of the Institution *by ballot* of the Executive Council.

† "Officers of the United States Navy or Marine Corps shall be entitled to membership of the Institution *without ballot*, upon payment of the entrance fee, but shall not be entitled to vote, nor be eligible to office.

"All persons not mentioned in the preceding sections, of honorable record and good standing, shall be eligible to Associate Membership *by a confirmative vote* of two-thirds of the members of the Executive Council present at any meeting. Associate Members shall be entitled to all the benefits of the Institution, including a share in its public discussions, but no Associate Member shall be entitled to vote or be eligible to office."

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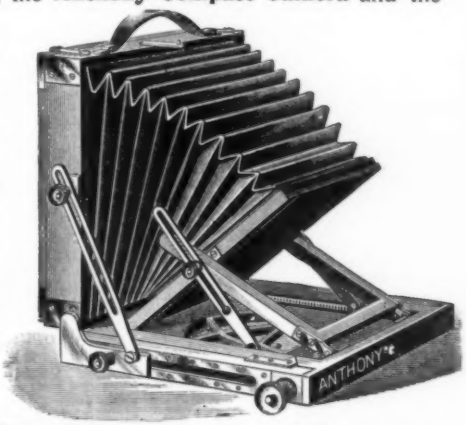

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THE FIRST REGIMENT OF CAVALRY.*

By Capt. R. P. PAGE WAINWRIGHT, 1st U. S. Cavalry.

THE "United States Regiment of Dragoons" was organized by Act of Congress approved March 2, 1833, becoming the "First Regiment of Dragoons" when the Second Dragoons were raised in 1836. Its designation was changed to "First Regiment of Cavalry" by the Act of August 3, 1861. The first order announcing appointments in the regiment was dated March 5, 1833, and gave the names of the colonel, lieutenant-colonel, major, four captains and four lieutenants, stating that the organization of the regiment would be perfected by the selection of officers from the "Battalion of Rangers." Headquarters were established at Jefferson Barracks.

The organization of the regiment does not appear to have been completed until June, 1834, the regimental return for that month naming the following officers:

Colonel Henry Dodge.

Lieutenant-Colonel Stephen W. Kearny.

Major Richard B. Mason.

Captains Clifton Wharton, E. V. Sumner, Eustace Trenor, David Hunter, Lemuel Ford, Nathan Boone, J. B. Browne, Jesse Bean, Matthew Duncan and David Perkins.

First Lieutenants P. St. G. Cooke, S. W. Moore, A. Van Buren, J. F. Izard, Jefferson Davis, L. P. Lupton, Thomas Swords, T. B. Wheelock, J. W. Hamilton (adjutant), B. D. Moore, and C. F. M. Noland.

Second Lieutenants James Allen, T. H. Holmes, J. H. K. Burgwin, J. S. Van Derveer, J. W. Shaumburg, Enoch Steen, James Clyman, J. L. Watson, and B. A. Terrett.

Brevet Second Lieutenants William Eustis, G. W. McClure, L. B. Northrop, G. P. Kingsbury, J. M. Bowman, Asbury Ury, A. G. Edwards and T. J. McKean.

Lieutenant Jefferson Davis was the first adjutant but resigned the staff position February 4, 1834, and was assigned to Company A.

In October, 1833, the five companies first organized were sent under Colonel Dodge to winter in the vicinity of Fort Gibson, Arkansas Territory, where they remained until June, 1834.

In June, 1834, the regiment was sent on the "Pawnee Expedition," during which, although it ended in September of the same year, one fourth of the officers and men of the command died of fevers. On the 6th of August, Colonel Dodge writes to Lieutenant-Colonel Kearny: "I have on my sick report 36 men, four of whom have to be carried in litters. My horses are all much jaded, and would be unable to return by the mouth of the Wishitaw and reach their point of destination this winter season. This has been

*An abridgment of Capt. Wainwright's "History of the 1st U. S. Cavalry."

a hard campaign on all; we have been for the last fifteen days living almost on meat alone. The state of the health of this detachment of the regiment makes it absolutely necessary that I should arrive at Fort Gibson as early as possible, as well as the difficulty of providing grain for the horses. I am well aware you are placed in a most unpleasant situation, encumbered as you must be with sick men, baggage and horses, and regret exceedingly that it is not in my power to help you."

For the winter, Headquarters with Companies A, C, D and G, were sent to Fort Leavenworth; Companies B, H and I, Colonel Kearny, commanding, into the Indian country on the right bank of the Mississippi, near the mouth of the Des Moines River; and Companies E, F and K, Major Mason commanding, to Fort Gibson.

Throughout the summer of 1835 all the companies of the regiment were kept in the field. The object appears to have been exploration chiefly, for no conflicts with the Indians took place. The regiment performed its duty thoroughly, as was shown by the letter of commendation sent by General E. P. Gaines, commanding West Department, to the regimental commander upon receipt of his report of operations.

Many letters written and orders issued about this time are of great interest and some are very amusing from the force of language used, showing great difference in military correspondence then and now; the court-martial orders are especially interesting on account of the peculiar sentences imposed.

During the year 1836 the general disposition of the regiment remained unchanged. The companies were employed in scouting among the Indians, especially along the Missouri frontier, a portion of the regiment going to Nacogdoches, Texas, for the purpose of keeping off white trespassers from the Indian country, and preserving peace between whites and Indians and among the Indians themselves; also in building wagon roads and bridges. During the winter the companies returned to their stations—Forts Leavenworth, Gibson and Des Moines.

Colonel Dodge resigned July 4, 1836, and was appointed Governor of Wisconsin. He was succeeded by Colonel Kearny. Major Mason was promoted vice Kearny, and Captain Clifton Wharton vice Mason.

The regiment was not engaged in the Florida war of this year, but Colonel Kearny, being called upon subsequently, reports, March 16, 1844;—"The only officers of the Regiment of Dragoons who died of wounds received r diseases contracted during the late contest with the Florida Indians are 1st Lieutenants J. F. Izard and T. B. Wheelock," and that no enlisted men of the regiment served there.

The circumstances attending the death of Lieutenant Izard are interesting. Being on his way from the east in January, 1836, to join his regiment, he heard at Memphis of Dade's massacre. He at once offered his services to General Gaines as a volunteer for the expedition then being organized in New Orleans for Florida, was appointed brigade major of the light brigade organized at Tampa Bay composed of the 2d Artillery, 4th Infantry and the Louisiana Volunteers, and had also the command of the advanced guard assigned him which he retained until he was shot.

On the 26th of February, 1836, the light brigade left Fort King for Ouithlacoochee, during the passage of which stream an attack by the Indians was anticipated. On the following day the place where General Clinch had his battle of December 25 was reached. Here a sharp skirmish took place and some men were lost. Having learned of a better ford below it was decided to take it. Izard, coming with his advanced guard to the bank of the river, posted his guard and went down the river alone to look for the ford. While wading in the stream he was struck by a bullet in the inner corner of the left eye, the ball passing out near the right temple. He fell, but called out while falling, "Lie still, men, and maintain your positions." He never spoke afterwards and died on the 5th of March.

First Lieutenant T. B. Wheelock left New York for Florida with a detachment of recruits in February, 1836. He distinguished himself with a portion of these recruits on the 10th of June at Fort Micanopy, and died at that post on the 15th of that month of a fever contracted during his service in Florida.

During the year 1837 the regiment was not called upon for any especially hard service. The usual scouting parties were sent out from time to time, and there were several changes of station, so that in June six companies were at Leavenworth and four at Fort Gibson.

The following extract from an order issued by General Gaines, commanding the Western Division, shows the high state of discipline prevailing in the regiment at this time.

"The First Regiment of Light Dragoons at Fort Leavenworth, recently inspected by the Commanding General, was found to be in a state of police and discipline reflecting the highest credit on Colonel Kearny—the exemplary commandant,—his captains and other officers, non-commissioned officers and soldiers, whose high health and vigilance, with the excellent condition of the horses, affords conclusive evidence of their talents, industry and steady habits."

In March, 1837, a regimental order designated the color of the horses of each company as follows:—A and K, black; B, F and H, sorrel; C, D, E and I, bay; and G, iron gray.

In October, 1837, and again in March, 1838, serious difficulties were reported between the settlers and the Osage Indians, and companies of the regiment were at once sent to the disturbed regions. On the second occasion the rapidity of Colonel Kearny's movements and the sudden appearance of 200 dragoons in their midst appear to have had a very quieting effect on the Indians, for after his return to Leavenworth Colonel Kearny reports no further danger of trouble with the Osages.

In April, 1839, the post of Fort Wayne, on the northwestern frontier of Arkansas, was established for the purpose of keeping the Cherokees in subjection, and by the end of October Companies E, F, G and K, were stationed there. In this same month Colonel Kearny, with Companies A, B, C, H and I, scouting, visited the post, but in November returned to Fort Leavenworth having marched about 550 miles.

Except that Companies A, C and D, under Major Wharton, were sent to Fort Gibson in December for temporary duty, nothing of any moment occurred to the regiment during the remainder of the year.

Twice in March and once in September, 1840, the regiment was called upon to overawe the Indians, and the end of that year found the Headquarters with Companies E, F, H, I and K, at Leavenworth; C, D and G, at Fort Gibson; A at Fort Wayne, and B at Fort Crawford.

During the period 1841-45 there is little of interest to record regarding the movements of the regiments. There was the usual detached service for companies, and changes between Leavenworth, Gibson, Wayne, Crawford and Fort Towson—on the northeastern boundary of Texas. The records show no engagements or excessive marches, except that in April, 1842, on account of some disturbance among the Cherokees, Colonel Kearny marched his command of five companies to Fort Gibson from Leavenworth, and then made a forced march of 57 miles to Fort Wayne in one day. The records do not show that these Indian disturbances amounted to anything; the Indians made no attacks on the troops and but few on the settlers; still it is fair to presume that the activity of Colonel Kearny and his dragoons held them in subjection, and by their timely arrival at points where trouble was imminent, overawed the savages and prevented bloody wars.

On May 18, 1845, Colonel Kearny with Companies A, C, F, G and K, left Leavenworth for an expedition to South Pass in the Rocky Mountains. The command reached Fort Laramie on the north fork of the Platte, June 14; marched to South Pass and returned to Laramie by July 13; thence via Bent's Fort on the Arkansas to Fort Leavenworth, where it arrived August 24, having made a march of 2000 miles in less than 100 days. In the order issued to his command after his return from this expedition Colonel Kearny says: "In the length of the march, the rapidity of the movement and the unimportant sacrifices made, the expedition is supposed to be wholly unprecedented; and it is with pride and pleasure that the Colonel ascribes the result to the habitual good conduct, efficiency, and attention to duty on the part of the officers and soldiers of the command."

At the end of the year Companies C, F, G and K, were at Leavenworth; A at Fort Scott; B at Fort Atkinson; D at Camp Boone, near Beatties Prairie; E and H in camp near Evansville, Ark.; and I at Fort Des Moines. The Headquarters of the regiment were at St. Louis, where they remained until April 23, 1846, when they were returned to Fort Leavenworth.

Colonel Kearny was promoted brigadier general June 30, 1846, and was succeeded by Colonel Mason. Major Wharton was promoted vice Lieutenant Colonel Mason, and Captain Trenor vice Wharton.

Very soon after the commencement of hostilities between the United States and Mexico, preparations were begun for the invasion of Mexican territory at various points. One expedition was to advance from the Missouri River west to Mexico, Santa Fé being its objective point. It was immediately determined, however, to push on with this column and occupy Upper California. General Kearny was placed in command of this "Army of the West," which consisted of Companies B, C, G, I and K, 1st Dragoons, two companies of artillery, two of infantry and nine companies of Missouri volunteer cavalry under command of Colonel A. W. Doniphan, in all about 1800 men. This command was concentrated at Bent's Fort on the Arkansas, from which point it marched for Santa Fé, August 1, 1846.

Some show of resistance to Kearny's advance was made by the Mexican governor of New Mexico, but Las Vegas was occupied on the 14th, and Santa Fé on the 18th of August without a conflict, the Mexicans retreating upon Kearny's approach. Leaving Colonel Doniphan in command at Santa Fé, General Kearny took up the march for California September 26, and encamped about 40 miles from San Diego December 5, where he was met by a small party of volunteers under Captain Gillespie, sent out from San Diego by Commodore Stockton to give information of the enemy, of whom there were supposed to be six or seven hundred opposed to Kearny's advance.

On the morning of the 6th Kearny's command met and defeated at San Pasqual, about 40 miles from San Diego, a body of Mexicans under General Andres Pico. Kearny had at this time about 300 men, composed of Companies B and C, 1st Dragoons, and volunteers. The action was severe, the 1st Dragoons losing three officers,—Captains Moore and Johnston and Lieutenant Hammond,—and 14 men killed; and about all the dragoons were wounded, principally with lance thrusts. General Kearny himself received two wounds, Lieutenant Warren of the Topographical Engineers, three; and Captain Gillespie of the volunteers, three. Kearny was compelled to remain at San Barnardino until the 11th on account of wounds, but reached and occupied San Diego December 12.

General Wilcox in his History of the Mexican War says: "At dawn of day the enemy, already in the saddle, were seen at San Pasqual. Captain Johnston charged them with the advanced guard, followed and supported by the Dragoons, and they gave way. Captain Moore led off rapidly in pursuit accompanied by the Dragoons (mounted on horses), and followed, though slowly, by those on tired mules. The enemy, well mounted and superb horsemen, after falling back half a mile, halted, and seeing an interval between Captain Moore with the advance and the Dragoons coming to his support, rallied their whole force and charged with lances. Moore held his ground for some minutes but was forced back, when those in the rear coming up, the enemy were in turn driven back and fled not to rally again. Kearny occupied the field and encamped upon it.

"But few of Moore's men escaped without wounds. Captain Johnston was shot dead at the commencement of the action; Captain Moore was lanced and killed just before the final retreat of the Mexicans; Lieutenant Hammond was also lanced, surviving the wound but a few minutes; two sergeants, two corporals, and 10 men of the 1st Dragoons, one private of Volunteers, and a citizen engaged with the engineers were killed."*

General Kearny with a force consisting of Company C, 1st Dragoons, (60 dismounted men) under Captain Turner, sailors and marines with a battery of artillery, and California volunteers, left San Diego for Los Angeles December 29. He reached and occupied Los Angeles January 10, 1847. The enemy under Governor Flores was encountered at the crossing of the Rio San Gabriel January 8, and on the plains of the Meza on the 9th, on

* In explanation of the remark "mounted on horses," it may be stated that, with a few exceptions, the Dragoons were mounted on tired mules which had been ridden from Santa Fé, more than a thousand miles.

both of which occasions he was routed with some loss. The loss to the Americans was one soldier killed, and two officers,—Rowan of the navy and Captain Gillespie,—and 11 privates wounded. With the loss of Los Angeles all resistance to the occupation of this portion of California ceased.

General Kearny had left Companies G and I at Albuquerque under Captain J. H. K. Burgwin. When Colonel Sterling Price (the successor of Colonel Doniphan in command at Santa Fé) learned of the seizure and murder at Fernando de Taos of Governor Bent and five others by the Mexicans (June 20), he moved out against them with a force of about 350 dismounted men and easily defeated them, June 24, at Canada. Captain Burgwin, with Company G, 1st Dragoons, also dismounted, joined him on the 28th, and the Mexicans, numbering about 500, were again encountered on the 29th in a cañon leading to Embudo, from which position they were driven out by Burgwin with a force of 180 men of Price's regiment and Company G. He entered Embudo the same day.

On the 31st, having united his force, Price moved towards the Pueblo de Taos, which he attacked February 3, but on account of its strength and the stubborn resistance offered, and more especially for the reason that the ammunition for the artillery had not come up, the attack failed. It was renewed on the following morning when Captain Burgwin, with his company of Dragoons and McMillan's of Price's regiment, charged, crossed the walls, and attacked the church, which, with other large buildings within the walls, was occupied by a large force of the enemy and was stubbornly defended. While gallantly leading a small party against the door of the church Burgwin received a mortal wound from which he died on the 7th. Company G sustained a loss in this engagement of one officer and 23 men killed. The Mexicans lost 153 killed and many wounded.

During the year 1847 regimental headquarters were still at Leavenworth and Companies A and E were with Taylor in Mexico. Company B was reorganized at Jefferson Barracks in May and sent to Albuquerque, N. M., being engaged while en route with Comanche Indians at Grand Prairie, Arkansas, June 26, losing five men killed and six wounded.

Company F escorted General Scott from Vera Cruz to the City of Mexico and was present at the battles at and near that city. From November 1 to December 20 it was engaged on escort duty between the city and Vera Cruz.

Companies D and K, as well as F, saw service on Scott's line in Mexico, and in 1848 the three companies returned to the United States and were stationed at various points on the northwestern frontier.

During the year 1849 the regiment lost three men killed and two wounded (one mortally) in Indian skirmishes, the particulars of which are not obtainable.

Brevet Brigadier General Mason, Colonel 1st Dragoons, died at Jefferson Barracks, July 25, 1850, and was succeeded by Colonel Thomas L. Fauntleroy, promoted from the Second Dragoons.

For the next three years there is no record of any important engagement, march or duty, performed by the regiment; in fact, very little attention was given to recording really important fights.

On March 30, 1854, Lieutenant J. W. Davidson, with Company I and 16 men of Company F, had a sharp fight with Apache Indians about 16 miles south of Taos, in which 14 men of Company I and 8 of E were killed, and Lieutenant Davidson and 14 men wounded. The Indian camp was surprised and captured, the Indians escaping, but while plundering the camp the troops were in turn surprised by the Indians, who returned and took Davidson at such disadvantage that the command narrowly escaped annihilation.

Regimental headquarters were transferred to Fort Union, N. M., in July, 1854, and throughout the following year the companies in New Mexico were almost constantly on the move. Colonel Fauntleroy made three expeditions against the Utahs and Apaches, and Companies I and K went with Colonel Miles against the Mescalero Apaches. Meantime Companies C and E took part in the Rogue River war in Oregon, in which, at the battle of "Hungry Hill," the troops were compelled to retire with a loss of 26 killed and wounded, after fighting a day and a half.

The headquarters of the regiment were established at Fort Tejon, California, in December, 1856, with Companies H and I. At this time Companies B, D, G and K were at Camp Moore, N. M.; C at Fort Yamhill, Oregon; E at Fort Walla Walla, Wash.; F at San Diego, Cal.; and A en route to Benicia Barracks, California.

From this time until the year 1861 scoutings and skirmishes with the Indians were almost incessant, and portions of the regiment were always found where the fighting was going on. Four companies were present with Chandler's expedition against the Navajos and Apaches in March and April, 1856. In 1856 two companies took part in numerous Indian skirmishes in Oregon and Washington; one was with Wright's expedition to the Walla Walla country in April, and to the Yakima country in June; later in the year it was out with Colonel Steptoe.

In May, 1858, Companies C, E and H formed part of Steptoe's expedition northward to the British line which, on the 17th of May, met a force of about 800 Spokane and other hostile Indians and was driven back.

In August of the same year Companies C, E, H and I were with Wright's column, which administered a severe thrashing, September 1, to the Indians who had fought Steptoe.

Company D was in the field in Arizona in 1858, and E in Oregon in 1859.

Colonel Fauntleroy resigned May 13, 1861, and was succeeded by Colonel B. S. Beall. By the Act of August 3 of this year the designation of the regiment was changed to "First Regiment of Cavalry."

During the months of November and December the regiment, excepting Companies D and G, was transferred from the Pacific coast to Washington, D. C., arriving at Camp Sprague, near that city, by the end of January, 1862.

At this time Companies D and G were at Camp San Christoval, N. M. They had abandoned and destroyed Forts Breckenridge and Buchanan and had taken station at Fort Craig. In January, 1862, they were General Canby's escort. Company D was engaged in a skirmish with rebels near

Fort Craig, February 19, 1862, and the two companies took part in the battle of Valverde, February 21. Company D took part in the engagements at Pigeon's Ranch, March 30; Albuquerque, April 25; and Peralto, April 27, 1862.

In June, 1863, the two companies were broken up, the officers and non-commissioned officers being transferred to Carlisle Barracks, where the companies were reorganized, joining the regiment at Camp Buford, Md., in October, 1863.

Colonel Beall was retired February 15, 1862, and was succeeded by Colonel George A. H. Blake, Major Wm. N. Grier of the Second succeeding him as lieutenant colonel of the First.

The regiment, now under the command of Colonel Grier, was attached to the 2d Brigade, Cavalry Reserve, Army of the Potomac, Colonel Blake commanding the brigade.

It will be impossible to give in detail the part taken by the regiment in all the battles and engagements in which it participated during the Rebellion. Only the names of battles are given, with the casualties and such short descriptions as may seem of interest.

At Williamsburg, May 4, 1862, a portion of the enemy's cavalry was repulsed by a brilliant charge of a squadron of the regiment commanded by Captain B. F. Davis. A rebel standard was captured; 13 casualties. At Gaines' Mill, June 27, Lieutenant Robert Allen was dangerously wounded; casualties, 26. The regiment was present at Malvern Hill, July 1; Kelly's Ford, March 17, 1863 (loss ten men); and Stoneman's Raid in April and May. At the battle of Beverly Ford, June 9, 1863, the gallant Captain B. F. Davis was killed while in command of the 8th N. Y. Cavalry. At Upperville, June 23, the regiment met the "Jeff Davis" Legion and the 1st and 2d North Carolina regiments in a charge. The regiment suffered severely, Lieutenants Fisher and Moulton being wounded and captured, and 51 men killed, wounded and missing, a large proportion of the wounded being disabled by the sabre.

At Gettysburg, July 1 and 3, Lieutenant Trimble was wounded, and the loss was 15 men. The regiment lost two men at Williamsport and on July 6 charged the enemy on the pike road to within half a mile of Funkstown, capturing an officer and 13 men, and driving the enemy within their lines. The regiment was engaged near Boonsboro, July 7, 8 and 9, losing 14 men. At Brandy Station, August 1, it repulsed the enemy in four charges, losing 11 men. With the Reserve Brigade it was then ordered to Washington to remount and equip. Camp Buford was established, where the brigade remained about a month when it was again ordered to the front.

The First Cavalry was engaged at Manassas Junction and at Catlett's Station, November 5; Culpeper, November 8; Stephensburg, November 26, and Mine River. A cantonment having been established at Mitchell's Station the regiment was employed during the winter doing picket duty along the line of the Rapidan.

A reconnoissance to the left of the enemy's line was made, February 6, 1864, by the 1st Division, Cavalry Corps, the First Cavalry leading the advance. Sharp skirmishes took place near the crossing of Robinson River

at Hume's Ford on the 6th and 7th. On the 6th the regiment charged the enemy, driving him from the ford and capturing four prisoners, and continued the pursuit to within two miles of Barnett's Ford on the Rapidan. On the morning of the 7th the regiment, again in the advance, encountered the enemy in force at the ford. One squadron,—G and M Companies under Capt. Fielner,—made a charge to gain possession of the ford, but was met by a heavy fire from infantry in strong position on the opposite side of the river and was recalled with loss of two men and six horses wounded. On the 27th General Custer started on his raid to Charlottesville, and on the 28th, the First Cavalry being in the advance, the enemy were encountered in their camp near Charlottesville from which they were driven and the camp partially destroyed. On the return march the Rosanna bridge was destroyed by the pioneers of the regiment under Lieutenant Ogden. On March 1st, shortly after leaving Standardsville, the enemy charged the 5th Cavalry, which regiment, supported by the First, returned the charge, capturing 25 rebels and killing or wounding several of them.

On General Sheridan's taking command of the Cavalry Corps the First Cavalry, commanded by Captain N. B. Sweitzer, was attached to Merritt's Reserve or Regular Brigade, Torbert's Division, and in the preparation for the Wilderness campaign the regiment was employed in picketing the Rapidan, taking part in the battles of Todd's Tavern, May 7, and Spottsylvania Court House, May 8, during the first of which six out of the 16 officers on duty with the regiment,—Captain Sumner and Lieutenants Hall, Hoyer, Pennock, Ward and Carr,—were wounded. During the two days fighting ten men were killed.

The regiment accompanied Sheridan on his raid around Richmond and took part in the following engagements; Beaver Dam Station, May 10; Yellow Tavern, May 11: Meadow Bridge, May 12; Mechanicsville, May 12; Tunstall's Station, May 14; Hawe's Shop, May 28; and Old Church, May 30.

At the battle of Cold Harbor, June 1, Captain Samuel McKee was mortally wounded and died on the 3d. Lieutenant Pennock was shot through both eyes, two men were killed and four wounded. The regiment accompanied General Sheridan on the Trevillian raid, and was present at the battle of Trevillian Station, June 11 and 12, on which days it suffered severely, losing Lieutenants Ogden and Nichols killed, and Captain Dunkelberger wounded. Three men were killed and 29 wounded or missing. The regiment was engaged in daily skirmishing during the return march to White House Landing, and was engaged with the enemy at that point on June 17, at the Chickahominy River on the 18th, and at the battle of Darby's Farm, June 28. At the battle of Deep Bottom, July 28, where the Regular Brigade, fighting on foot, routed a brigade of Confederate cavalry, a battle flag was captured by the First Cavalry.

On July 31, the 1st Division marched to City Point, embarked the next day, and was transported to Washington to assist in repelling the threatened attack of General Early. The regiment disembarked at Giesboro Point with its division, August 3, and went into camp near Washington.

On August 5th the movement to Harper's Ferry was taken up, the 1st

Division being ordered to the Shenandoah Valley under Sheridan. Harper's Ferry was reached on the 8th and the division moved out on the Halltown road and camped. General Sheridan having formed his cavalry into a corps under General Torbert, General Merritt succeeded to the command of the division, and Colonel Alfred Gibbs to that of the brigade.

On August 10th a reconnoissance was made by the Reserve Brigade in the direction of Winchester, and the enemy's cavalry was engaged and routed. From this day until the close of Sheridan's operations in the valley, the regiment was engaged in almost daily fighting, and took part in all the important battles except Fisher's Hill, where it was otherwise employed as will be seen hereafter.

The enemy's cavalry was engaged, August 11, and driven several miles towards Newtown, but our cavalry became opposed to a heavy force of infantry and the entire First Division was put in on foot. The 1st Cavalry charged across an open plowed field and drove the enemy from the timber beyond, but were in turn repulsed by a heavy flank fire and compelled to take refuge behind rail barricades, which they held until dark in spite of persistent and repeated efforts of the enemy to dislodge them. Lieutenant Harris was wounded in this affair.

On August 13, Lieutenant J. S. Walker, the commissary of the regiment was killed by Mosby's guerrillas near Charleston, Va., while going to Harper's Ferry in the discharge of his duties. About this time also the regimental trains of the Reserve Brigade were captured and destroyed by Mosby. These trains contained the regimental and company records and the personal effects of officers. Several of the wagons belonging to the regiment were saved and with them some of the records. From August 16th until the 20th, the First Cavalry was employed, together with the whole of the 1st Division, in the destruction of all wheat and forage, and the seizure of all horses, cattle, sheep and hogs, accessible in the valley.

The 1st Division was engaged with Early's infantry near Charleston on the 21st, and on the 25th the 1st and 3d Divisions marched in the direction of Leetown, near which place a strong force of the enemy's infantry was encountered and defeated with the loss of many prisoners. On the 28th the Division marched again in the direction of Leetown, the Reserve Brigade leading, with the First Cavalry in advance. The Rebel cavalry was found in force beyond Leetown and a severe fight followed. Two squadrons of the First were deployed to the left and right of the pike and a third held in reserve. The deployed squadrons were driven back and the reserve squadron was moved into the pike in columns of fours and in that formation charged with the sabre. The enemy's cavalry, a full brigade, charged with the pistol, and, just before the two bodies met, slackened speed to deliver their fire, when Hoyer's squadron struck them at full charging gait and sent them flying to the rear. Our loss was ten or twelve men wounded with the pistol and the gallant Hoyer killed. He was shot through the body while leading the charge and died in an hour. The command of the squadron then fell to Lieutenant Moses Harris, and at about this time Captain E. M. Baker succeeded Captain Sweitzer in command of the regiment.

From the 5th of September until the 19th the First was employed on

picket duty along the Opequan and in harassing the enemy,—an arduous duty, with constant skirmishing and attendant casualties. Colonel C. R. Lowell, 2d Mass. Cavalry, "The bravest of the brave," now succeeded to the command of the Reserve Brigade, and the period of his command is described as the most brilliant in its history.

The First took part in the memorable charge of the Reserve Brigade at the battle of Winchester, September 19, and, in conjunction with the 2d Cavalry, captured two stands of colors and some 200 prisoners. The casualties of the regiment were 37 killed, wounded and missing, including Lieutenant McGregor wounded.

The battle of Fisher's Hill was fought and won September 22, 1864. On this day General Torbert, having been ordered to proceed with Merritt's and Devin's Divisions through the Luray Valley to fall upon Early's retreating army at New Market, in the event of his defeat at Fisher's Hill, found the forces of the rebel General Wickham strongly entrenched near Milford. Torbert's failure to dislodge Wickham and Sheridan's disappointment over the failure of his plan to capture the whole of Early's army are matters of history.

On the morning of the 23d the ambulance train was attacked by some of Mosby's guerrillas near Front Royal, who were then chased by the First and Second Cavalry and a number killed and ten or twelve captured. Lieutenant McMasters of the Second was cruelly murdered, after capture, by the guerrillas, in retaliation for which several of those captured were hung.

Learning on the 23d of the victory at Fisher's Hill, Torbert returned with his command to Milford during the night, and finding the enemy's strong position abandoned pushed on until the enemy's cavalry was encountered near Luray early on the morning of the 24th and signally routed, narrowly escaping destruction. The First Cavalry took part in this engagement, and, September 28, in the action at Waynesboro, in which it met with a loss of 18 killed, wounded and missing.

General Sheridan having decided to withdraw his army to a defensible position nearer to his base of supplies in the northern end of the valley, commenced the retrograde movement on the 6th of October. General Rosser becoming emboldened by Sheridan's apparent retreat, took the initiative and so annoyed Sheridan that he determined to punish him, and the memorable battle of Tom's Brook, or "Woodstock Races," took place on the 9th. The entire management of the affair was given to General Torbet, and how well he redeemed himself for his failure in the Luray Valley by the ignominious rout of Rosser and Lomax is well known. The 1st Cavalry led the advance of the Reserve Brigade during the charge on the pike against Lomax's cavalry, from Tom's Brook to Edinborough—18 miles. The chase was continued by the 2d Brigade to Mount Jackson, 8 miles further on. The First Cavalry captured 4 guns, 4 wagons, and a number of prisoners, with a loss of two men "missing in action." It is related that some of the guns here captured were quite new, and had been marked "For General P. H. Sheridan, care of Jubal Early."

The First Cavalry played an important part in the battle of Cedar Creek, October 19, 1864. After the surprise and defeat of Wright in the morning

a position was taken about one mile north of Middletown, which was held by the divisions of Merritt and Custer until Sheridan came up with that portion of his army which he had met flying to the rear, a defeated and demoralized mob. The First Cavalry was formed, one squadron to the left, the other to the right, of the Valley pike, dismounted, behind stone walls, the third squadron being held in reserve. This position was held with the greatest difficulty, the advanced squadron, commanded by Harris, being subjected to an enfilading fire. The personal example however, of the brigade, regimental, and squadron commanders, kept the men up to their places until the return of the Sixth Corps when the squadrons were mounted and joined in the pursuit of Early's beaten forces, which was continued on the 21st and 22d as far as Mount Jackson.

The regiment now returned to Middletown and during the fall and winter was engaged in numerous skirmishes and took part in Merritt's raid to the Loudon Valley and Torbert's raid to Gordonsville. In December the regiment was assigned to duty at the headquarters of the Cavalry Corps in Winchester.

On the 27th of February, 1865, General Sheridan commenced his last expedition through the Shenandoah Valley, having for his object the destruction of the Va. Central R. R, and the James River Canal, and the capture of Lynchburg. Sheridan took only the Cavalry Corps and a portion of his artillery. The regiment was present with the Reserve Brigade and took part in the battle of Waynesboro, March 2, where the remnant of Early's army was captured. It was also engaged in many skirmishes during the march from Charlottesville to White House Landing while destroying locks and the embankment of the James River Canal, railroads and rebel supplies, and arrived at White House Landing March 17, taking part in the engagement of that day.

On the 27th of March Captain Baker was relieved from command of the regiment by Captain R. S. C. Lord.

The First Cavalry was present and took part in all the battles and daily skirmishes of the Cavalry Corps until the close of the war. On March 30th it was in the engagement on White Oak Road; March 31, at Dinwiddie Court House; April 1, at Five Forks. Here the regiment made a brilliant charge on an entrenched position of the enemy, which was carried and 200 prisoners captured. April 2, in the engagement near Southside R. R.; April 6, at the battle of Sailor's Creek; and April 9, at Appomatox,—the surrender of the Army of Northern Virginia. After the surrender the regiment returned to Petersburg where it remained in camp until April 24, when it marched with the Cavalry Corps towards North Carolina for the proposed junction with Sherman. On the surrender of Johnston's army the Corps returned to Petersburg and, the regiment, escorting General Sheridan, left for Washington May 8, arriving May 16, and taking part in the "Great Review."

In the same month the regiment was ordered to Louisiana, arriving at New Orleans May 31 and remaining in that city or its immediate vicinity until December 29 when it embarked for California via the Isthmus of Panama. It took post at the Presidio of San Francisco January 22, Com-

panies A, G and K going February 5 to Drum Barracks, where Companies C, D and E, followed them February 17, Company L going to Sacramento. In June of the same year regimental headquarters went to Fort Vancouver, W. T., and the several companies had been distributed through Oregon, Washington Territory, Idaho, California, Nevada and Arizona, no two being at the same station.

Owing to the vast extent of country guarded by the regiment its service for many years following was very arduous. Scouting for Indians and escort duty of various kinds were incessant. Hardly a regimental return fails to record some expedition or report some Indian fight. It will be impossible within the limits to which this sketch is confined to give more than their dates and localities.*

1866.

Headwaters Malheur River, Ore., July 18–20–22, Company I. Eleven Indians killed and many wounded. Loss, one man killed. Near Camp Watson, Ore., September 2. Company I. One Indian killed and many women, children and animals captured. Expedition from Owhyee River in September. Company M. Many Indians killed. Loss, one wounded. Expedition from Fort Bidwell, Cal., October 22–29. Company A. Fourteen Indians killed, three women, four children, and entire camp captured. Loss, one wounded. Expedition from Fort McDowell, A. T., September 22–October 3. Company E and detachment of C. Fifteen Indians killed and 10 captured. Scout from Camp Watson, Ore., October 8–24. Company I. Three warriors killed, and 8, with all the women, children, stock and provisions captured. Sierra Anchas, November 17. Company E. Six warriors killed and 5 captured. Scout from Camp Watson, Ore., November 16–24. Lieutenant and ten men of Company I. Three Indians killed. Crook's expedition against Owhyee River Indians. Battle of December 26. Company F. Thirty warriors killed. Loss of company, one killed and one wounded. Scout from Camp Wallen, A. T., December 9–15. Part of Company G. Three Apaches killed. Scout from Camp Watson, Ore., December 1–7. Twenty men of Company I. Fourteen Indians killed and 5, with 28 head of stock, captured.

1867.

Scout from Fort McDowell, January 7–9, and again January 27–31. Company E. Forks of Malheur River, Ore., January 9. Company F. Thirty Indians and 43 head of stock captured. Stein's Mountain, I. T., January 29. Company M. Band of 90 warriors attacked; 60 killed and 27 captured. Escort consisting of one officer and 21 men of Company E attacked by Indians in Arizona, February 23. Loss, one man wounded. Scout from Camp Independence, Cal., March 7–13. Twelve men of Company D. Twelve warriors killed or wounded. Dunder and Blitzen Creek, Nev. Horses and pack mules of Company H stampeded by Indians. The company was put afoot. Scout from Camp Watson, Ore., in May. Eleven

* It is my desire to publish a more complete history of the First Cavalry, and I will be only too thankful to receive data, descriptions of engagements, personal anecdotes, etc. I can assure contributors careful perusal of their papers with proper entry, and that they will be given full credit for any information furnished. R. P. P. W.

men of Company I. One Indian killed and 3 captured. Scout from Camp Wallen, A. T., June 9–24. Company G. Three Indians killed. Malheur River, Ore., July 7 and 19. Company I. Four warriors killed and 22 captured. Silver River, Ore., September 6 and 16. Company A. Twenty-four Indians killed and 19 captured. Loss, two men wounded. Crook's expedition against hostiles of Oregon and northern California, August 23–October 5. Companies F, H and M. Company H in fight at "Infernal Caverns," near Pitt River, September 26 to 28. Indians completely routed. Loss of company, Lieutenant Madigan and four men killed and four men wounded. Scout from Camp Wallen, A. T., in December. Company G. One Indian killed and 4 captured.

1868.

Dunder and Blitzen Creek, Ore., March 14. Company H. Band of Indians exterminated. Lieutenant Parnell and one man wounded. Malheur River, Ore., April 5. Company F. Thirty-two Indians killed and 2 captured. Skirmish with Indians in Arizona, May 1. One man of Company C wounded. Scout from Camp Lyon, I. T., May 26–31. Eight men of Company M. Thirty-four Indians killed. Scout from Camp Harney, Ore. Fight on May 31 in which five Indians were killed and the remainder surrendered. Loss, one man wounded. Near Camp Reno, A. T., June 16. Four men of Company E killed while escorting mail. Morgan's Ranch, A. T., July 21. One man of Company K killed. Scout from Fort Reno, A. T., in July. Company E. One Indian killed; loss, one man wounded.

1869.

Scout from Camp Lowell, January 13. Company G. One Indian killed. and one wounded. Expedition against Arivaypa Apaches, February 2. Detachments of Companies G and K. Eight Indians killed and 8 captured. Expedition against Apaches in March. Company G. Three Indian camps of 105 huts destroyed. Fight at Mount Turnbull, A. T., April 29. Companies G and K. Twenty-eight Indians killed and 8 captured.

Fight with Indians in Arizona, May 11. Seven men of Company G. One man wounded. Scout from Camp Grant, May 22. Company K. Four Indians killed. Fights on Rio Pinto, June 2 and 4. Company E. Twenty-two Indians killed and 4 captured. Scout from Camp Bowie, June 30. Company G. Four Indians captured. Expedition to White Mountains of Arizona, July and August. Company L and detachment of K. Fifteen Indians killed and 8 captured. Pursuit of marauders of Cochise's band, October 8. Company G. Twelve Indians killed and stolen stock recovered. Fight with Cochise's band in Chiricahua Mountains, October 20. Company G. Twenty Indians killed and others wounded. One man killed and 1 wounded. Skirmish with Cochise's band, October 31. Companies C, G and L. Two Indians killed. Scout from Camp McDowell, A. T., December 9–11. Twenty men of Company E. Entire band of 11 Mojave Apaches killed.

1870.

Skirmish with Cochise's band, January 27. Company G. Thirteen Indians killed and two captured. Attack on rancheria in Tonto Valley, A.

T., May 25. Company E. Twenty-one Indians killed and 12 captured. Scout from Camp Grant, June 1–9. Company K. Thirty-seven Indians killed.

Skirmish in the Penal Mountains, A. T., August 1. Twenty-five men of Company K. Six Indians killed. Loss, one man killed. Penal Mountains, October 29. Company C. Four Indians killed. Loss, two men wounded.

1871.

Penal Mountains, January 1. Company G. Nine Indians killed. Scout from Camp Apache, A. T., February 16–27. Companies L and M. Rancheria of San Carlos Apaches attacked, capturing horses and destroying food and camp equipage. Scout from Fort Whipple, A. T., September 30. Company A. Seventeen warriors killed. Fight at Bad Rock Mountains, December 11, 1872. Detachments from Companies L and M. Fourteen Indians killed and many wounded. Attack on Apache rancheria, December 13, 1872. Detachments of Companies L and M. Eleven Indians killed and 6 captured. Scouts from Camp Verde, A. T., December 23, 1872; January 4, 1873; February 1–16, 1873; and February 18; March 7, 1873. Company I. Eight Indians killed, 3 squaws and 2 children captured. Engagement with Apaches May 6, 1873. Company A. Four Indians killed. Regimental Headquarters were transferred from Fort Vancouver to Camp Warner, Ore., in May, 1870, and thence to Benicia Barracks in October of the same year. Just two months later,—December 15, 1870,—Colonel Blake was retired from active service on his own application, and Colonel A. C. Gillem of the 11th Infantry was transferred to the First Cavalry in his stead.

The Modoc Indians were a small tribe living in northern California near Tule Lake and Lost River. Through the intercession of interested civilians orders were issued for their removal to the Klamath Indian Reservation. They went on the reservation, but, on account of ill treatment left it, and the War Department was then directed to carry out the orders. The Indians at once commenced hostilities and one of the most protracted and obstinate Indian wars of later years followed.

Company B left Fort Klamath, Ore., November 28, 1872, for the purpose of arresting "Captain Jack" and the leaders of his band of Modocs, and at daylight on the 29th surprised the Indians in their camp near Lost River, Ore. They refused to surrender and an engagement followed in which 8 Indians were killed and many wounded, and the camp, squaws, and property were captured. The company lost 2 men killed and 6 wounded, 2 of them mortally. The company then went into camp at Crowley's Ranch on Lost River opposite the Indian camp.

Company G from Fort Bidwell took station December 13, at Land's Ranch, Tule Lake, near the Indian stronghold. The Indians attacked this camp, December 21, and were repulsed, but not until 2 men and 5 horses had been killed. Company B now joined Company G and the two companies marched against the Indians, January 16, 1873, in conjunction with General Wheaton's column, with which was also serving at this time Company F and a detachment of Company H. The Indians attacked Companies B and G the same afternoon, but were repulsed, the companies losing

3 men wounded. The general engagement took place January 17, and lasted from 7.30 A. M. to 9.30 P. M., when the troops retired, going finally into camp at Applegate's Ranch, Clear Lake, Ore. The regiment lost two men killed and two officers,—Captain Perry and Lieutenant Kyle,—and 8 men wounded, one mortally.

The Indians attacked a wagon train January 22, driving away the escort, but Captain Bernard, 1st Cavalry, came up with reinforcements and the Indians were repulsed, losing one killed and many wounded.

Company K from Fort Halleck, Nev., joined the battalion February 18, which now consisted of Companies B, F, G and K, under Captain Biddle, who was soon succeeded by Captain Bernard. Colonel Gillem, 1st Cavalry, was commanding the expedition, and Company H joined the column February 10.

During the night of April 14 the companies of the 1st Cavalry moved with the rest of the command to invest the Modoc stronghold, and in the "Second battle of the Lava Beds," April 15, 16 and 17, drove the Indians out of their position and into the rocks and mountains. The 1st Cavalry lost 2 men killed and 2 wounded.

On April 26 Companies B and F went to the scene of the "Thomas massacre" and brought off a number of the wounded and dead.

The same companies were attacked by Indians May 10, at Sorass Lake, Cal., but repulsed them with the loss of one warrior killed and 2 wounded. The command lost one killed and 6 wounded, 2 of them mortally.

On May 17 Companies B, G and K, with a battery (serving as cavalry) of the 4th Artillery, all under Major John Green, came upon a band of Modocs which they drove five miles, killing one and capturing several squaws and children. The troops followed the trail and on May 22, 70 Indians—men, women and children—surrendered. "Boston Charlie" was captured May 29, and on the 31st "Sconchin," "Scarfaced Charlie," and 27 other Indians surrendered.

Companies F and H were sent from Applegate's Ranch May 31 to follow up those of the Modocs who had eluded Green's command, and found them June 1st, when the whole party surrendered. With the capture of "Captain Jack," the Modoc war ended, and by the end of June the companies which had been engaged in it had returned to their proper stations.

The companies left in Arizona were moved north, and by the end of October, 1873, headquarters with Companies A and D were at Benicia Barracks; B at Fort Klamath; C at Camp McDermitt, Nev.; E at Fort Lapwai, I. T.; F, L and M at Fort Walla Walla, W. T.; G at Camp Bidwell, Cal.; H and K at Camp Harney, Ore.; and I at Camp Halleck, Nev.

Colonel Gillem died at his residence in Nashville, Tenn., December 2, 1875, and was succeeded by Colonel Cuvier Grover, promoted from the 3d Cavalry.

On June 15, 1877, Companies F and H, under Captain Perry, were ordered to proceed to Camas Prairie to the assistance of the settlers of Mount Idaho, I. T., who were threatened by the Nez Percé Indians under Chief Joseph. Learning that the Indians were crossing Salmon River and could be taken at a disadvantage, the march was given that direction and Chief

Joseph's camp was found and taken by surprise, but the Indians quickly rallied and repulsed the troops with severe loss, Lieutenant E. W. Theller, 21st Infantry (attached), and 33 men being killed and two wounded.

All the companies of the regiment, except M at Colville and A at Camp Harney watching the Piutes, were now ordered into the field against the Nez Percés.

Companies E and L joined General Howard's command June 21, and on July 1 surprised and attacked the camp of "Looking Glass" on the Clearwater, I. T. The village was entirely destroyed, several Indians killed and about a thousand ponies captured. On July 2 the same command attempted to form a junction with Company F, which was on its way from Lapwai. On the 3d the Indians ambushed the advanced guard, consisting of Lieutenant S. M. Rains, ten men of the battalion and two civilian scouts, killing them all, and were then found to be in such force and so strongly posted that it was considered imprudent to attack them. The junction with Company F was effected, however, on July 4, and the same afternoon the Indians attacked, the fight lasting until sunset. The battalion (E, F and L) joined General Howard at Grangerville, July 8. Company H had joined July 2, and the battalion was commanded by Captain David Perry.

On the 11th of July General Howard crossed the Clearwater with his whole command and moved down that stream with Company H in the advance. The Indian camp was discovered and at once attacked, the fight lasting two days and ending with the retreat of the Indians. Company B joined in time to take part in the fight on the 12th. The regiment lost 3 men killed and 4 wounded.

The battalion made a reconnoissance July 18, on the Lo-Lo trail, and the Indian scouts accompanying it were ambushed and met with considerable loss. One Nez Percé was killed.

Major Sanford's battalion, consisting of Companies C, D, I and K, joined General Howard on the Clearwater, July 28, and the expedition across the Lo-Lo trail began on the 30th. Companies B, C, I and K, under Major Sanford, accompanied it, and Companies D, E, G and L, with other troops under Major Green, constituted the "Reserve Column" which remained at Camas Prairie until August 5, when it moved near to Mount Idaho, and established a permanent camp called Camp Howard.

Companies F and H were stationed at Fort Lapwai.

General Howard's trying and "stern" march across the Lo-Lo trail, and the final surrender of Chief Joseph to General Miles at Bear Paw Mountains are matters of history. In the Indian attack at Camas Creek August 20, Companies B and L were engaged, losing one man killed and one wounded. At Judith Basin the battalion was detached from General Howard's command and directed to return, and all the companies had reached their stations by the end of November.

Company K and a detachment of C, attached to General Sturgis' command, took part in the engagement with the Nez Percés at Canyon Creek, M. T., September 13, 1877.

At the outbreak of the Bannock war in May, 1878, Company G was the first body of troops to reach the scene of hostilities, and Captain Bernard

reported that the Indians numbered from 300 to 500. They were moving towards Stein's Mountain, Ore. The whole of the First Cavalry was at once ordered into the field and Colonel Grover sent to Fort Boise to take charge of operations there. Companies D, I and K, were with him.

Companies F and L joined Company G on the Owyhee, June 17, and the three companies reached Camp Harney on the 21st, where they were joined by Company A. These four companies were designated the "Left Column" by General Howard.

On the morning of June 23 the Left Column struck the main camp of the hostiles on Silver Creek, and drove the Indians out of it and into a cut-bank, made by the creek, which had been prepared for defense. The action lasted into the night and in the morning it was found that the Indians had gone. Many Indians were killed and the camp was destroyed. The battalion lost 2 killed and 3 wounded. Company K joined the battalion June 27, and on the 28th the cavalry cut loose from the foot troops and pushed forward on the trail of the Indians. The fertile John Day Valley was saved in great part by this vigorous pursuit, and on July 5th General Howard overtook the command, arriving with it at Pilot Rock on the 7th. Here it was joined by Companies E and H. The Indian camp was located and at sunrise on July 8 Captain Bernard moved his battalion to the attack.

The Indians, about 300 in number, occupied the crest of the high and steep hills near Birch Creek, and were at once attacked. Captain Bernard giving the first example of fighting cavalry on foot without separating the men from the horses. All the companies, except A with the pack train, were deployed and used in the engagement, and the Indians were driven from three successive positions and finally four or five miles further into the mountains. Four men were wounded, one mortally, and probably 20 horses were killed. The enemy's loss could not be told; their women, children and best horses were sent off, seemingly towards the Grande Ronde, before the action began.

Lieutenant C. E. S. Wood, A. D. C., says: "The entire fight was closely watched by the general commanding, who desires to express his opinion that no troops ever behaved better or in a more soldierly manner than did the officers and men engaged in this encounter." The command camped for the night among the rough cañons adjacent to the battle-field.

Captain Bernard was now directed to take his command, except Company K, to Fort Walla Walla to refit. Company K was sent to join the infantry column and with it moved to the Umatilla Agency, near which the hostiles were reported to be. Here the Indians made an attack July 13. In the ensuing fight Company K held the right of the line and took part in the final charge by which the Indians were driven off the field and for three miles into the hills. At the request of the Indian Agent the command moved back to the agency that night, but two days later seven dead Indians were counted upon the battle-field.

Companies A, E, F, G, H and I, now under Lieutenant-Colonel J. W. Forsyth, 1st Cavalry, left Fort Walla Walla July 13—the day of the fight at Umatilla Agency—in search of the Indians, who were found to be travelling in the direction of John Day River. On the 20th Forsyth's scouts were

ambushed, which caused a halt and deployment of the command, but when the line moved forward the Indians had gone. On the 22d the battalion reached "Burnt Meadows," where it was joined by Companies D and I, under Major Sanford, and on the 27th it went into camp at Malheur Agency to await supplies. The hostiles had now split up into many small parties which were followed up and nearly all ultimately captured.

During the months of September and October the companies were sent to their permanent stations, and the return for November 30 shows Companies A and E at Camp Harney, Ore.; B, D, F, K and M, at Fort Walla Walla, W. T.; C at Camp Bidwell, Cal.; G at Fort Boise, I. T.; H at Fort Colville, W. T.; I at Camp Halleck, Nev., and L at Fort Klamath, Ore.

In the year 1881 Companies C, G, I and M were sent to Arizona, and on October 2, Company G, with other troops, was in action near Cedar Springs with Apaches. The hostiles fought with great boldness and desperation and the fight lasted until 9 P. M., when the Indians escaped. Company G had two men wounded and 12 horses killed.

On the 4th of October Companies G and I had a running fight near South Pass of the Dragoon Mountains, in which the hostiles were followed into Sonora, Mexico.

In October, 1881, the "Companies" began to be designated "Troops" on the Regimental Return.

Troop G returned to Fort McDermott, November 9; Troop I to Camp Halleck, December 27; Troop M to the Presidio of San Francisco, January 20, 1882; and Troop C to Fort Bidwell, April 16.

In June, 1884, the regiment was transferred to the Department of Dacota, after a tour of nearly 30 years on the Pacific coast, during the greater part of which time its stations were remote from civilization and its duties of a most arduous and thankless character.

Headquarters and Troops D, G I, K and M, went to Fort Custer; A, C and F went to Fort Maginnis; E to Fort Ellis; H and L to Fort Assinniboine; and B to Fort Keogh.

Colonel Grover died at Atlantic City, N. J., June 5, 1855, and was succeeded by Colonel N. A. M. Dudley, promoted from the 9th Cavalry.

Conflict with the "Crows" came in the fall of 1887, and on the morning of November 4, Colonel Dudley left Fort Custer with Troops A, B, D, E, G and K, and Company B, 3d Infantry, with a section of Hotchkiss guns, to arrest "Sword Bearer" and the Indians who had fired into the agency buildings on the night of September 30.

On the 5th a demand was made upon the Indians for the surrender of these men, and they were given an hour and a half to comply with the demand. At the end of that time the battalion of the 1st Cavalry, with Moylan's troop of the 7th Cavalry on the right, moved out in front of camp. At the same time a great commotion was observed in the Indian camp, and "Sword Bearer" and another chief dashed out leading from 120 to 150 warriors equipped for battle. The Indians charged but were repulsed and fell back into the timber along the river where they had dug many rifle pits from which they now kept up a constant fire. This fire was returned, and "Sword Bearer" was seen to fall, when all fighting quickly ceased. All

the Indians whose surrender had been demanded and who had not been killed were at once brought in and delivered to the Department Commander, who sent them to Fort Snelling. The cavalry battalion returned to Fort Custer on the 13th.

Colonel Dudley was retired from active service August 20, 1889, and was succeeded by Colonel J. S. Brisbin, promoted from the 9th Cavalry. On the 31st of December of that year Headquarters and Troops B, D, E, G and M, were at Fort Custer; A and L at Fort Maginnis; C, F and H at Fort Assinniboine; I at Fort Leavenworth; and K at Camp Sheridan, Wyoming.

In April, 1890, the Cheyennes assumed a threatening attitude and their agent called upon the commanding officer of Fort Custer for protection, who sent Major Carrol with Troops B, D and M to the Tongue River Agency where they established Camp Crook. In September a white boy was murdered by "Head Chief" and "Young Mule," and every attempt to arrest the murderers failed. On the 11th they sent word that they would attack the agency and on the 12th made their appearance on a hill commanding the agency buildings where they opened fire upon them. They were soon dislodged and killed.

The regiment took part in the operations against the hostile Sioux in the winter of 1890-91, but was not brought into actual contact with them.

In December, 1890, word having been received that a troop of cavalry was surrounded by hostile Indians at or near Cave Hills, Montana, Troop A made one of the most remarkable marches on record in going to its relief. It marched 186 miles, 95 of which were made in 25 hours, and 170 in 53½ hours. The report which caused such tremendous exertion proved to be without foundation.

On the 22d of April, 1891, Colonel Brisbin was transferred to the 8th Cavalry with Colonel A. K. Arnold who had been the lieutenant colonel and now became the colonel of the First.

In 1892 the regiment was transferred to the Department of Arizona, relieving the 10th Cavalry. Headquarters and Troops C, E, F, H and K, going to Fort Grant, A. T.; B and I to Fort Bayard, N. M.; D to Fort Apache, A. T.; and G to San Carlos. Troop A was at Fort Meyers, Va., and was not moved. Since its arrival in Arizona the regiment has not been engaged in any serious Indian difficulties, although the several troops have been kept in practice in field work by that ever active and elusive "Kid," who has been responsible for more movements of troops than any Indian ever known.*

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*In the preparation of this paper I have confined myself almost entirely to the regimental records, but have received much valuable information from General P. St. George Cooke, Colonel A. K. Arnold, Major Moses Harris, Captain T. T. Knox, Captain F. A. Edwards, Lieutenant A. L. Mills and Lieutenant W. S. Scott, to all of whom I am very grateful.

R. P. P. W.

THE FIRST REGIMENT OF INFANTRY.

Compiled in the Office of the MILITARY SERVICE INSTITUTION.

THE original First Infantry was first organized under Resolve of Congress of date June 3, 1784, to serve twelve months, and was continued by subsequent Resolves until it was recognized by the Act of September 29, 1789, as the "Regiment of Infantry" in the service of the United States. The Act of April 30, 1790, more fully completed its organization and when a second regiment was formed under the Act of March 3, 1791, the older organization became the "First Regiment of Infantry."*

Brevet Brigadier General Josiah Harmar was the first "lieutenant colonel commandant" of the regiment and commanded it until his resignation in 1792. He was also "General in Chief of the Army," and in that capacity conducted the expedition against the Miami Indians in Ohio in September and October, 1790. His regiment was with him, Captain John Armstrong and a detachment of 30 men taking part in the engagement on the Miami River, October 19; and a detachment of 60 men under Major Wyllys being engaged, October 22, near the same place. In this action Major Wyllys was killed.

Arthur St. Clair, who had been a major general in the Revolutionary Army was appointed "General in Chief" in March, 1791, superseding Harmar.

St. Clair in his turn proceeded against the Miamis, and was even more thoroughly defeated than Harmar had been, suffering a loss in killed and wounded of nearly 900 out of his total strength of 1400. The battle took place near the sources of the Maumee of the Lakes, and the fugitive army did not halt until safely within the palisades of Fort Jefferson, 29 miles to the rear, where the First Infantry, about 300 strong, was found in garrison.

The Act of March 5, 1792, gave the army a new organization, with the title of "Legion of the United States." The Legion provided for a total strength of 5120 officers and men and was divided into four "sub-legions," each of which was composed of one troop of dragoons, one company of artillery, two battalions of infantry and one of riflemen, each battalion having four companies. The First Infantry was merged into the First Sub-legion.

The Legion participated in the Battle of the Maumee Rapids under General Wayne, August 20, 1794, in which the Indians were utterly defeated and disheartened. The First Sub legion was at this time commanded by Lieutenant Colonel J. F. Hamtranck, and among the officers mentioned by General Wayne in his report of the battle as deserving special mention,

*See page 40 of the "Historical Register of the U. S. Army," F. B. Heitman, Washington, 1890.

were Colonel Hamtranck, Captain Prior, and Lieutenant W. H. Harrison (afterwards President of the U. S.) all of the First Sub-legion.

The Act of May 30, 1796, discontinued the Legion, and the line of the military establishment was made to consist of the "Artillerists and Engineers," two companies of dragoons, and four regiments of infantry, the First Sub-legion resuming its old designation of the "First Regiment of Infantry." Colonel Hamtranck was continued as the lieutenant-colonel commandant of the regiment until the reorganization of 1802, when he became its first full colonel. He died April 11, 1803, while commandant of Detroit and its dependencies.

Colonel Hamtranck had the faculty of inspiring men with confidence, and although he was a rigid disciplinarian, was beloved by his men, for he was kind hearted, generous and brave. The officers under his command placed a stone upon his grave, which is in the grounds attached to St. Anne's Orphan Asylum at Detroit, as a "grateful tribute to his merit and his worth."

In the year 1803, the Government determined to explore the newly acquired territory, known as the Louisiana purchase, as far as the course and sources of the Missouri River are concerned, and to determine upon the feasible water communication to the Pacific Ocean. To accomplish these purposes, the Lewis and Clarke expedition was organized by the President. Captain Meriwether Lewis, the head of this expedition, was an officer of the regiment, and at the time secretary to the President, Thomas Jefferson. The party proceeded in boats from St. Louis, examining the country along the Missouri river to its sources, thence through the Rocky Mountains and down the Columbia River to the Pacific Ocean. The expedition set out on May 14th, 1804, and reached St. Louis on its return, September 23, 1806.

In 1807, Captain Lewis was appointed Governor of Louisiana, and by his firm but just conduct, soon harmonized the various factions which at one time threatened serious trouble in the territory. Captain Lewis inherited hypochondria, and whilst suffering under a temporary derangement of mind, he put an end to his life, while en route from St. Louis to Washington, in September, 1809.

For many years following General Wayne's victory the Indians appear to have given little or no trouble, and the regiment remained in garrison at Detroit and vicinity until the outbreak of the War of 1812.

On the 25th of July, 1812, the first blood of the War of 1812 was shed in a skirmish not far from Detroit, and in August General Hull sent an expedition from that place to open communication with the River Raisin and to escort an expected supply train into Detroit. Among the troops so sent were two detachments of the First Infantry, commanded by Lieutenant D. Stansbury and Ensign R. A. McCabe. The enemy was met at Maguaga, August 9, and defeated, yet the troops were recalled to Detroit without acomplishing anything farther, and on the 16th of the same month were included in Hull's disgraceful surrender of the troops under his command.

Heald's Company of the First Infantry was at this time stationed at Fort Dearborn (now Chicago), and Captain Heald had received orders from General Hull to evacuate his station, distribute the government

property among the Indians, and proceed to Detroit. He obeyed orders but had hardly begun his march (August 15) when he was attacked by ten times his force of Indians, and after two-thirds of his men had been killed or wounded was forced to surrender.

Later in the year (September 5 to 8) the Indians attacked Fort Madison, a short distance from the present city of St. Louis. Lieutenants Hamilton and Vasques of the First Infantry with a small detachment of the regiment garrisoned the fort, and after a gallant defense drove the enemy away.

A general "Return of the Army" of date July 1, 1814, reports the First Infantry, 214 strong, as under orders to join the "Division of the Right," which garrisoned the Lake frontier from Buffalo to Sacketts Harbor, and it is probable that the detachment of 99 men under Captain John Campbell, First Infantry, which was attacked by the Sac and Fox Indians while in boats near the mouth of Rock River on the Mississippi, was moving in obedience to these instructions. The detachment lost 36 in killed and wounded.

The regiment joined General Brown's army on the Niagara River on the day of the battle of Niagara, July 25, 1814, and during the action was not attached to either brigade. At this time it was commanded by Lieutenant-Colonel R. C. Nicholas, as its colonel — Jacob Kingsbury — was the inspector general of the military department in which it was serving. The regiment took part also in the siege of Fort Erie,—August 1 to September 17, 1814.

The war had no sooner come to an end than the army was reduced (Act of March 3, 1815) to a total of 10,000 men, to consist of artillery, infantry and riflemen, in such proportions as the President should judge proper. He fixed the proportion by the order of May 17, 1815, at one regiment of light artillery, the Corps of Artillery (32 companies), 8 regiments of infantry and one of riflemen. Special pains appear to have been taken in this reorganization to prevent any continuance in the new organizations of the regimental traditions of the old, for not a single regiment of infantry retained its original number. The First Infantry of the preceding pages became a part of the new Third Infantry, while the old Second, Third, Seventh and Forty-fourth, were united to form the new First Infantry. The old Fourth went into the new Fifth; the Fifth into the Eighth; the Sixth into the Second, and the Eighth into the Seventh.

The present First Regiment of Infantry was organized pursuant to Act of March 3, 1815, and General Orders of date May 17, 1815, from the Second, Third, Seventh and Forty-fourth Regiments of Infantry, and was assigned to duty in the Division of the South with headquarters at Pass Christiana, La. Not one officer of the old First Infantry was assigned to it nor were any from the old Second or Seventh, although the reorganization order would seem to require it. Seventeen officers of the 3d and 44th Regiments which had so recently greatly distinguished themselves at the battle of New Orleans, were so assigned, and the remainder were apparently selected from the army at large.

Brigadier General Daniel Bissell was retained in the army with reduced

rank, being made colonel of the First with the brevet of brigadier-general. Lieutenant Colonel George Croghan, who afterwards became the inspector general of the army, was made the lieutenant-colonel; and Brevet Lieutenant Colonel Thomas K. Jesup, who was afterwards quartermaster general, was the major.

The Act of March 2, 1821, again reduced the army, the ordnance and artillery being consolidated into four regiments, the number of infantry regiments reduced to seven, and the rifle regiment being disbanded.

General Bissell left the service and was succeeded by Colonel Talbot Chambers. Lieutenant Colonel Croghan had resigned in 1817 and had had several successors; Lieutenant Colonel Z. Taylor was now assigned to the regiment. Major Jesup had been promoted in 1817 to the Third and had been succeeded by Major R. Whartenby, who now retained his place as major of the regiment. Many changes also took place in the lower grades.

The headquarters of the First Infantry were established at Baton Rouge, La., and appear to have remained in Louisiana until 1828, when the regiment relieved the Fifth at Fort Crawford (Prairie du Chien), Fort Snelling, and Fort Winnebago (Green Bay). In 1831 the garrison of Fort Winnebago was moved to Fort Armstrong (Rock Island, Ill.).

The Black Hawk War of 1832 took place in the region garrisoned by the First, and Companies A, B, G and K were with General Atkinson at the battle of the Bad Axe, August 2, 1832. In this action Major Bliss commanded the battalion, and Colonel Taylor, who was now the colonel of the regiment, the brigade to which it was attached.

In 1837 the regiment was transferred to Florida and, with the exception of Company C, was present at the battle of Okeechobee, December 25, 1837. On this occasion Colonel Taylor commanded the entire force engaged, and Lieutenant Colonel Davenport the regiment, which was held in reserve until the action was nearly over. In this report Colonel Taylor says:

"To Lieutenant Colonel Davenport and the officers of the 1st Infantry I feel under many obligations for the manner in which they have under all occasions discharged their duty; and although held in reserve and not brought into battle till near its close, yet their eagerness to engage and the promptness and good order in which they entered the hammock when the order was given for them to do so, is the best evidence that they would have sustained their own characters, as well as that of the regiment, had it been their fortune to have been placed in the hottest of the battle."

Colonel Taylor was brevetted brigadier general for this action, and on the 15th of May, 1838, succeeded General Jesup in the command of the army of Florida. The regiment now was kept almost continually on the move, until the arrival in Florida in May, 1839, of General Macomb, who held a great council with the Indians, and was led to believe that he had concluded a treaty of peace with them; yet on the 23d day of July following they treacherously attacked Colonel Harney's command of 28 men at Charlotte's Harbor, killing more than half of them. Hostilities were resumed but the Indians avoided any direct conflict with the troops, and kept them, as formerly, constantly scouting, almost always without tangible result.

Early in 1840 General Taylor requested to be relieved from duty in

Florida, and his request was granted to take effect on the 1st of May. The regiment was still in Florida in November of that year, but early in the summer of 1841 returned to its old stations,—Forts Winnebago, Snelling, Crawford and Atkinson,—in the northwest. General Taylor was given higher command from this time forward and his immediate connection with the regiment ceased, so that when Lieutenant Colonel Davenport was promoted to the Sixth in 1842 and was desirous of remaining with the First, a mutual transfer was arranged and Colonel Davenport became the colonel of the First in July, 1843. In 1845 regimental headquarters were moved to Jefferson Barracks, and the regiment garrisoned that station and Fort Scott, Mo.

During the Mexican War a part of the regiment continued to garrison these stations and Fort Snelling, but Companies C, E, G and K, under Lieutenant Colonel Henry Wilson, joined General Taylor in Northern Mexico and did gallant service at the capture of Monterey. In this battle Colonel Wilson commanded a brigade and Captain Abercrombie the battalion, which suffered a loss of 43 officers and men killed or wounded. Lieutenant Territt was killed, Lieutenant Dilworth mortally wounded, and Captains Abercrombie and Lamotte were wounded.

When General Taylor sent all his regulars to join General Scott early in the year 1847, this battalion went with them and was present at the siege of Vera Cruz (March 9 to 28, 1847), and was afterwards designated as the garrison of the City and Castle, where it remained until the end of the war. It was then stationed upon the line of the Rio Grande where it remained for many years.

On the 31st of January, 1850, Colonel Davenport resigned from the army and was succeeded by Brevet Major General Bennett Riley, who was then commanding the military department of Upper California. General Riley died June 9, 1853, and was succeeded by Colonel Joseph Plympton.

In January, 1850, the regiment garrisoned Forts Merrill, McIntosh, Duncan and Ringgold Barracks, and early in this year the Indians became very troublesome, murdering settlers and stealing stock, and many attempts were made to punish them.

Captain King of the First, commanding at Fort McIntosh, sent Lieutenant Hudson, with a detachment of Company G in pursuit of Indian horse thieves, April 3, 1850. They encountered a party of Indians on the 7th and had a severe fight in which one soldier was killed and Lieutenant Hudson and three men were wounded.

Captain Plummer of the First, commanding at Fort Merrill, sent out Lieutenant Underwood with a sergeant and 12 men June 8, 1850, to open a direct road between that post and Laredo. He met and exchanged shots with Indians on the 8th, and on the 12th had a fight with them in which he was wounded and seven of his men were killed or wounded.

From this time until the year 1856 there appears to have been little of interest in the history of the regiment.

In September, 1856, a scouting party from Fort Clark, which included Captain Gilbert and 18 men of Company B, surprised three parties of In-

dians near the junction of the Rio Grande and Pecos rivers, killing four and wounding four of them.

In July, 1857, the Indians, numbering from 80 to 100, attacked a mail escort from the 8th Infantry, and a wood party consisting of a sergeant and six men of the 1st Infantry, at a place called the "Ripples."

A detachment of 40 men of the 1st Infantry at Fort Lancaster under Lieutenants Haskell and Sherburne, with 40 men of the Eighth from Fort Davis, was sent out against them. The men were placed in the wagons and the column was given the appearance of a provision train. The ruse was successful and the Indians, supposed to be Mescalero Apaches, attacked the train, July 24, 1857, and were driven off with loss.

Lieutenant J. E. Powell, 1st Infantry, left Fort Arbuckle February 23, 1859, with a detachment composed of men from Companies D and E, 1st Cavalry, and E, 1st Infantry, in pursuit of Comanche Indians. He met and defeated them the next day, killing five, with a loss of three men wounded, one mortally.

On May 7, 1860, Sergeant T. G. Dennin, Company K, 1st Infantry, in command of the escort to a train going to Fort Lancaster, was attacked by 40 or 50 mounted Indians, who were repulsed. The sergeant and party were commended for their courage and cool judgment.

Colonel Plympton died June 5, 1860, and was succeeded by Colonel Carlos A. Waite, who, on the 1st of January, 1861, had his headquarters with a part of his regiment at Fort Chadbourne, Texas. The other companies were then at Fort Lancaster, Camp Cooper and Camp Verde, in Texas, and at Forts Cobb and Arbuckle in the Choctaw Nation.

Texas seceded from the Union February 1, 1861, and appointed commissioners to confer with General Twiggs in regard to the surrender of all Government property and the removal of all U. S. troops from the State. General Twiggs was relieved from the command of the Department of Texas January 28, and was succeeded by Colonel Waite, who found everything military in a chaotic condition and devoted his whole energy to getting his troops safely out of the State and back into loyal territory. But five companies of his own regiment were in Texas,—A, G, H, I and K,—the remainder being in the Indian Territory. The Texas companies were ordered to rendezvous with other troops of the Department at Green Lake, 20 miles from Indianola, and succeeded in reaching that place.

Companies A, H and I got safely away, but the non-commissioned staff and band, with Companies G and K, were captured April 25, on transports, at Saluria, Texas, by the Texan forces. They were immediately paroled, engaging not to serve against the Confederates until exchanged, and sailed on the schooner *Horace*, reaching New York May 31.

The first transport that got safely away was ordered to leave two companies of the First at Key West, and probably did so, for a Return of the Department of Florida of date December, 1861, reports a part of the regiment at Fort Taylor. These companies were relieved early in 1862 and in April of that year Companies A, H and I, had joined the other companies of the regiment in the West.

Company G was reorganized in 1861, and in October of that year formed

a part of the city guard of Washington, D. C. It was still in Washington in May, 1862, but for Pope's campaign in Northern Virginia (August 16 to September 2, 1862) it was attached to the 6th Infantry battalion, and with it formed a part of the 2d Brigade, 2d Division, 5th Corps. At the Second battle of Bull Run it was under the command of Captain Marston and lost eleven men killed and wounded.

On the night of September 16–17 at Antietam the battalion was on picket duty, and on the 20th took part in the action near Shepherdstown.

At the battle of Fredericksburg Company G was attached to the 2d Infantry battalion and with it crossed the river December 13, and on the 14th was under fire all day within short range of the enemy's line. It recrossed the river on the 16th.

This company remained with the 2d Infantry in the Army of the Potomac until after January 31, 1863.

The five companies of the regiment in the Indian Territory at the outbreak of the war,—B, C, D, E and F,—marched to Fort Leavenworth, reaching that post May 31, 1861, under the command of Lieutenant Colonel W. H. Emory, who had been directed (April 17) to collect all the troops in the Indian Territory and take them to that station.

On the 24th of July, 1861, the organization of General Nathaniel Lyon's army at Springfield, Mo., was announced, and Captain Plummer's battalion, consisting of Companies B, C and D, 1st Infantry, and a company of recruits for the Mounted Rifles (3d Cavalry), formed a part of its third brigade.

This battalion was present at the battle of Wilson's Creek, Mo., August 10, 1861, losing 80 officers and men killed, wounded and missing. It was in the advance from the first, and in the battle was on the left of the line. The conflict lasted six hours almost without interruption and left the Union forces in full possession of the field. Captains Plummer, Gilbert and Huston, and Lieutenant Wood were mentioned for gallantry, the two first being wounded.

At the siege of New Madrid, March 3 to 14, 1862, Companies A, B, C, D, H and I, 1st Infantry, were present and were not assigned to any division, but were detailed, March 4, as a support to the artillery. Companies A and H, under Captain Mower, manned a siege battery, and the men of this command were the first to enter the enemy's works, March 14, 1862.

Immediately after the capture of New Madrid the Union forces were pushed down the right bank of the Mississippi and batteries were constructed, the lowest being on Ruddle's Point nearly opposite Tiptonville, through which latter place all the enemy's supplies for Island No. 10 were received. On the 17th of March, five of the enemy's gunboats

"advanced against the battery,—which consisted of two 24-pdr. siege-guns and two 10-pdr. Parrotts, manned by a detachment of the 1st Infantry (Company I), under Lieutenant Kinzie Bates. * * * The gunboats ran up to within 300 yards and a furious cannonade was kept up for an hour and a half, when they were repulsed with the loss of one gunboat sunk, several badly damaged, and many men shot down at their guns by our sharpshooters from the rifle-pits. Our loss was one man killed.

From that time no attempt was made against the battery and all communication from below with the forces near Island No. 10, was cut off."

Although their line of communication was cut the Confederates held their position until April 8, when they surrendered. The final attack by the Union forces on the 7th was supported by a battery of 32-pounders under Capt Williams, 1st Infantry, which had been erected a few days earlier opposite Watson's Landing.

Later in the same month Companies A, B, C, D, H and I were at Hamburg, Miss., under Captain George A. Williams, and on the 24th the battalion was detailed to man the heavy siege artillery, consisting of two 20-pounder Parrotts, four 30-pounder Parrotts, and four 24-pounder siege guns. With the exception of the 20-pounders, which were attached to the reserve, the heavy batteries were directed to remain temporarily at Hamburg and to place the guns in position to protect the storehouses there. On the 13th of May the battalion was before Corinth with its siege train, and on the 15th the 60th Illinois Volunteers were detailed to support its guns. On the 29th the 20-pounders and 30-pounders opened fire, doing considerable execution, and on the 30th the enemy evacuated the place. The works were at once occupied by the Union forces and the First Infantry battalion with other troops took station there.

When the five companies came in from the Indian Territory they were stationed at Fort Leavenworth and Brevet Major W. E. Prince, captain of Company E, 1st Infantry, commanded that post for many months.

This company under Lieut. Offley was sent with other troops, August 12–14, on a reconnoissance to Independence, Mo., but did not come into contact with the enemy.

It was also sent August 17–27, 1862, with an expedition to Kansas City, which place was reported in danger of an attack. The company manned a light battery on this occasion and was commanded by Lieutenant C. S. Bowman, 4th Cavalry. The expedition moved August 17 and after repairing the fortifications of Kansas City, moved on in search of the enemy, who was finally found in an almost impenetrable forest about fifteen miles from Independence, Mo. Colonel Burris, who commanded the column, reports:

"I then moved with my command in a westerly direction toward the nearest point to where water could be obtained, when soon the enemy was seen emerging from the woods, marching south, and crossing our line of march at right angles, directly in our rear. We quickly took position on an eminence near the Hickory Grove with the battery, supported by the infantry in the centre and a battalion of cavalry on either flank. The enemy (some 1000 or 1200 yards distant) formed line of battle, but after a few well directed shots from Bowman's battery their line was broken, they were thrown into confusion, and their march to the south resumed. Following them up with small detachments of cavalry they were soon discovered to be in full retreat."

In October and November, 1862, Companies E and F were at Fort Scott, Kansas, very much reduced in numbers; and in February, 1863, Company E was at Fort Leavenworth.

Companies A, B, C, D, H and I, at Corinth were still in charge of the heavy artillery in position for the defense of that place when the Confed-

erates attacked it, October 3 and 4, 1862. Company C under Lieutenant Robinett manned Battery Robinett; Companies D and I, Battery Williams, and Companies A, B, and H, Battery Phillips. Captain G. A. Williams, was in command of all the siege artillery, and reports as follows:

"About 3.30 A. M. October 4, the enemy opened on our forts and their supports with artillery. Battery Robinett returned the fire immediately. * * * I opened with three 30 pounder Parrott guns, immediately followed by Battery Phillips with an 8-inch howitzer which enfiladed the rebel battery. * * * The rebel artillery was silenced in less than thirty minutes, and they retired leaving one gun and a caisson on the field. About 9.30 or 10 A. M., the enemy were observed in the woods north of the town forming in line, and they soon made their appearance charging towards the town. As soon as our troops were out of the line of fire of my battery we opened upon them with two 30-pounder Parrott guns and one 8-inch howitzer which enfiladed their line * * * and continued our fire until the enemy were repulsed and had regained the woods.

"During the time the enemy were being repulsed from the town my attention was drawn to the left side of the battery by the firing from Battery Robinett, where I saw a column advancing to storm it. After advancing a short distance they were repulsed, but immediately reformed and, storming the work, gained the ditch. They then reformed, and, restorming, carried the ditch and the outside of the work, the supports having fallen a short distance to the rear in slight disorder.

"The men of the First U. S. Infantry, after having been driven from their guns (They manned the siege guns) resorted to their muskets and were firing from the inside of their embrasures at the enemy on the outside, a distance of about ten feet intervening; but the rebels having gained the top of the work, our men fell back into the angle of the fort as they had been directed to do in such an emergency. Two shells were thrown from Battery Williams into Battery Robinett, one bursting on top of it and the other near the right edge. In the meanwhile the 11th Mo. Vols. (in reserve) changed front, and, aided by the 43d and 63d Ohio Vols. with the 27th Ohio Vols. on their right, gallantly stormed up to the right and left of the battery, driving the enemy before them. The battery could not open on the retreating enemy, for its commander, —Lieutenant Robinett,—was wounded, and 13 of the 26 men that manned it were either killed or wounded."

General Stanley says concerning this part of the conflict:—

"At the same instant the 11th Missouri and the 27th Ohio rushed upon the enemy at a run without firing, and the hill was cleared in an instant, the enemy leaving the ditch and grounds covered with his dead and wounded. Many threw down their arms and called for quarter. The old soldiers of the First Infantry quit their cannon and picked up their old trusty muskets and prevented the enemy crossing the parapet with the bayonet. The enemy was repulsed and the fight was over."

On the day after the battle—October 5—the battalion with other troops, was assigned as the garrison of Corinth and remained there until General Grant ordered it to Memphis, January 22, 1863. At this time Major Maurice Maloney was in command.

During February, 1863, the battalion, still consisting of Companies A, B, C, D, H and I, under Major Maloney, moved from Corinth to Memphis and, later, to the vicinity of Vicksburg. It was nominally a part of the 1st Brigade, 14th Division, 13th Corps, but was actually in charge of a siege train throughout the siege of Vicksburg and never served with its brigade.

On the 22d of March, General McClernand was directed to forward at once to the Yazoo Pass expedition four 30-pdr. Parrotts, with not less than 80 men of the 1st Infantry, to be under the command of Captain G. A. Williams, 1st Infantry; but as General Grant wrote on the same day that "It is now clearly demonstrated that a further force, in by way of Yazoo Pass, can be of no service," it is probable that this order did not go into effect.

Captain E. D. Phillips of the First reports, under date of April 22, 1863, from "Camp at Millikens Bend, La.," that on the 17th April he had opened fire upon the court-house and railroad depot in Vicksburg with two 30-pdr. Parrotts placed in a casemate battery opposite the town, and had continued the firing with increasing accuracy until the night of the 20th, when, in obedience to instructions, he had embarked his detachment, guns, ammunition, etc., on a transport and had reached the camp of the First Infantry on the date of the report.

At the time of the first assault upon Vicksburg (May 22), Captain Offley with a detachment of the regiment was in charge of a sunken battery containing two 30 pdr. Parrotts, situated on that part of the line occupied by the 3d Division, 17th Corps, afterwards known as Battery Logan; while Major Maloney, with the remainder, was opposite the point assaulted by the 2d Brigade, 14th Division, and the 2d Brigade, 10th Division.

General McClernand reports concerning this assault that "A portion of the 1st U. S. Infantry, under Major Maloney, serving as heavy artillery added to their previous renown. Neither officers nor men could have been more zealous and active. Being in the centre, they covered in considerable part the advance of Benton's and Lawler's brigades and materially promoted their partial success."

This battery was on an elevation about 600 yards distant from the salient of the enemy's line which was assaulted, and commanded a fine view of all, the movements in its front. General Grant afterwards frequently visited one of the batteries served by the battalion during the siege, to watch the effect of its fire and that of the other batteries in sight. His favorite seat was on a certain log which soon became known as his and was always reserved for him.

On the 17th of June the 30-pdr. Parrotts were moved to a redoubt far advanced in the sap, where they were established under the command of Lieutenant Branagan, 1st Infantry, while Captain Offley was given two 9 in. Dahlgrens in Battery Logan.

On the 25th of June, at 4.30 o'clock in the afternoon, a mine was sprung under one of the enemy's works and the 45th Illinois Volunteers charged into the gap thus made. Hand grenades were freely used on both sides in this fight, Private William Lazarus of Company I, 1st Infantry, being detailed on the Union side to throw them. After throwing about twenty he was mortally wounded, when three men were detailed from the same command to continue the work.

The regiment added greatly to its reputation for gallantry and efficient service during the siege and, though always on duty at the front, met with little loss.

With the successful termination of the siege (July 4, 1863), the besieging army was at once made use of in other directions, and the First Infantry finally went to New Orleans where it became the provost guard and was quartered in Odd Fellows' Hall, opposite Lafayette Park. Here it was joined by its colonel—R. C. Buchanan—who had been promoted to the regiment from the 4th Infantry, February 8, 1864, by the retirement of Colonel Waite. In December, 1865, however, Colonel Buchanan left the regiment on detached service and was succeeded in command by Lieutenant Colonel W. H. Wood.

At the close of the war the regiment went to Jackson Barracks, where it remained till 1869, actively engaged in the stirring events of early reconstruction times, in which it rendered efficient service.

In the early spring of 1869 it was transferred to the department of the Lakes, with headquarters and five companies at Fort Wayne, two companies at Fort Porter, two at Fort Brady and one at Fort Mackinac.

In April of this year the regiment was consolidated with the 43d Infantry, under the Act of March 3, 1869. The 43d was a Veteran Reserve regiment, and many of the officers received into the First by the consolidation had been disabled through wounds received or disease contracted during the war. One effect of the consolidation was that Lieutenant Colonel Pinkney Lugenbeel succeeded Lieutenant Colonel Wood.

On the 15th of December, 1870, Colonel Buchanan was retired from active service and was succeeded by Colonel Thomas G. Pitcher (late 44th Infantry) from the unassigned list.

In May, 1872, Companies I and K were sent to Houghton, Mich., to quell a riot which had developed among the miners of the Calumet and Hecla copper mine. The mere presence of the troops was sufficient to prevent the destruction of property of great value and the proposed flooding of the mine.

The regiment served in the Department of the Lakes until July, 1874, when it was transferred to the Department of Dakota, exchanging stations with the 22d Infantry. The headquarters and six companies took station at Fort Randall; A and B companies were sent to Fort Hale; while F and H garrisoned Fort Sully.

On July 6, 1875, a detachment of eleven men of Company G, 1st Infantry, under Sergeant Danvers, who had been sent to the Ponca Agency to protect the Poncas against an anticipated raid of the Sioux, had a fight with the latter in which several Indians were killed or wounded. The detachment loaded an old cannon with pieces of iron, and with this improvised ammunition repulsed three assaults after which the attacking party withdrew.

In consequence of the Custer Massacre (August, 1876), Companies G and K were sent to Standing Rock Agency, now Fort Yates. Here some of the officers and the few men remaining from the war period, renewed an experience gained during the war,—the building of log huts for occupancy during the winter.

In May, 1877, Companies B, G, H and K, were sent to the cantonment on Tongue River, Montana, and during the summer these companies

thoroughly explored the country between the Yellowstone, Tongue, Powder, and Little Missouri rivers and the Black Hills, and formed a part of the command which drove the remnant of Lame Deer's band into the agency, for which service it received the thanks of General Sheridan. It was owing to the long and continued marches made by these companies that General Miles did not take the battalion with him when he left Tongue River to head off the Nez Percés. Lieutenant Maus, 1st Infantry, was, however, selected by General Miles to accompany him and was with the scouts when the Indian camp was discovered. He rendered most valuable service in the series of fights which resulted in the surrender of Chief Joseph and his band.

Colonel Pitcher was retired from active service June 28, 1878. The Act of June 17, 1878, had prohibited all promotion above the grade of captain, and in consequence the First Infantry was without a colonel until the restriction was removed in the spring of 1879, when Lieutenant Colonel W. R. Shafter of the 24th Infantry was promoted to the First to date trom March 4, 1879.

Companies F and K formed a part of the garrison of Fort Meade, Dakota, while that post was building in the fall and winter of 1878. Officers and their families, and the men, lived in tents until well into the winter, and whenever the thermometer dropped below — 30°, as it frequently did, the experience, to say the least, was not pleasing.

In June, 1880, the regiment was sent to the Department of Texas, and, during the summer of that year, the companies, with the exception of C and F at Ringgold and B at San Antonio, were engaged in opening up a wagon road and the country between the mouth of the Pecos River and the Chenati Mountains. Upon the completion of this duty the companies took station at Fort McKavett, and a few months later at Fort Davis and sub posts.

The Indian outbreak in Arizona in the spring of 1882 caused the regiment to be sent to that Department, where it remained until July, 1886, the companies garrisoning Forts Grant, McDowell, Bowie, Huachuca, Lowell, Verde, Thomas, Apache, and Whipple Barracks. During this period the companies did garrison duty, detachments being frequently sent out to guard water-holes. Several of the officers, notably Lieutenants Maus, Pettit and Faison, rendered valuable service in the field during the Geronimo campaign.

In July, 1886, the regiment was transferred to the department of California, where it is at present (January, 1895) serving. The Indian troubles in Nebraska and South Dakota took the regiment to those States in December, 1890. Companies A, B, C, D, E, G and H, formed a part of the command which was employed in the field until the early spring in guarding the Pine Ridge Agency and aiding to avert what threatened to be one of the most serious conflicts in which the Sioux have at any time been concerned. The band of the regiment accompanied the command from California, and was the means of giving much pleasure to the officers and men of the different organizations located in its vicinity. It was the only band present at the review of all the troops under General Miles' command,—

some three thousand or more,—which was held before their departure from the agency.

First Lieutenant John S. Mason, Jr., died in camp at Pine Ridge Agency, February 13, 1891.

Upon being relieved from this duty the companies of the regiment returned to their stations in the Department of California early in March, 1891.

The regiment has had numerous summer camps of instruction, frequently joining with the National Guard of the State in this duty. The camps have been located at Santa Cruz, Santa Barbara and Monterey.

The recent railroad strikes took the regiment into the field. Owing to the bitter feeling prevailing in California against the Southern Pacific Railroad company, the strike in that State early developed a serious phase which was intensified by the failure of the National Guard to respond properly to the demands made upon it by the State authorities. Under these conditions the services of the regular troops were peculiarly valuable, and much useful information can be derived from a study of the arrangements made for the journey of the headquarters and five companies of the regiment from Oakland to Los Angeles when escorting the first train through after the inauguration of the strike.

Companies of the regiment have been stationed at Alcatraz, the Presidio and Gaston, and they now form the garrisons of Angel Island and Benicia Barracks and San Diego.

The following officers and enlisted men of the regiment have been mentioned in orders from the War Department for distinguished service.

Captain Marion P. Maus, General Orders No. 39, 1891, "For gallantry in action against Geronimo's band of hostile Apache Indians, near the Aros River, Mexico, January 10, 1886, and in the encounter with Chihuahua troops on the following day (11th) and for the marked skill and ability with which, after the death of its commanding officer, he conducted the expedition back to the United States."

General Orders No. 41, 1891. "May, 1885, and eleven months following," for services in the field in Arizona and Sonora.

Captain Thomas H. Barry, Private George Klinhaus and George Wilkensen, Company A, and Frank Hennessy (now out of service) Company B, General Orders No. 70, 1893, "For meritorious conduct in saving a sailor from drowning in San Francisco Bay, California, October 2, 1892."

Lieutenant Samson L. Faison, General Orders No. 41, 1891, "May, 1885, and eleven months following," for services in the field in Arizona and Sonora.

Lieutenants Lewis H. Strother and Sydney A. Cloman, General Orders No. 100, 1891, the former, for highly efficient services while conducting a band of Cheyenne Indians from Pine Ridge, South Dakota, to Fort Keogh, Montana; and the latter, "For the excellent judgment and discretion with which he executed the instructions of Major General Miles in the arrest, at White Clay Creek, South Dakota, of the Indian Plenty Horses."

Announcement.

THE Board of Award selected to consider the merits of the essays submitted in competition for the prize of 1894, have rendered their report, awarding the prize of the Institution to Captain E. A. Ellis, 8th U. S. Cavalry, for the best essay on "Discipline:—Its Importance to an Armed Force and the Best Means of Promoting and Maintaining it in the United States Army."

The essays of 1st Lieutenant M. F. Steele, 8th U. S. Cavalry, and 1st Lieutenant E. M. Lewis, 20th U. S. Infantry, received first and second honorable mention respectively.

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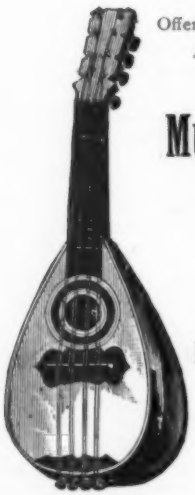

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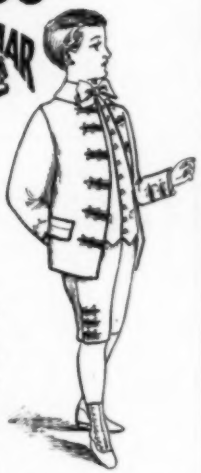

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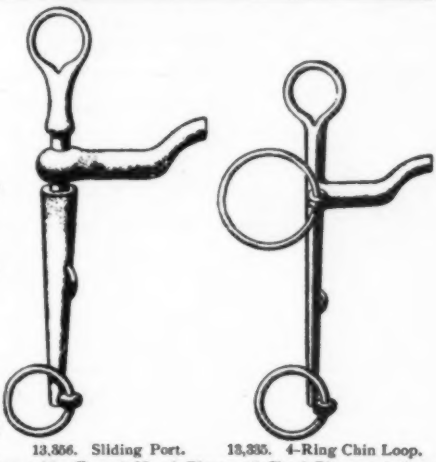

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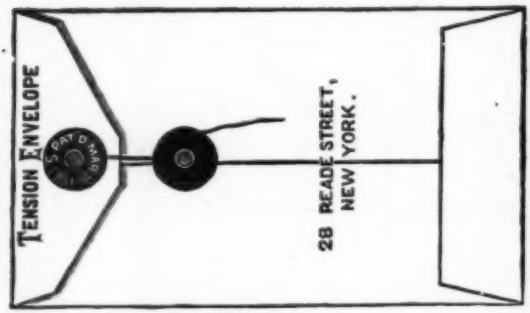

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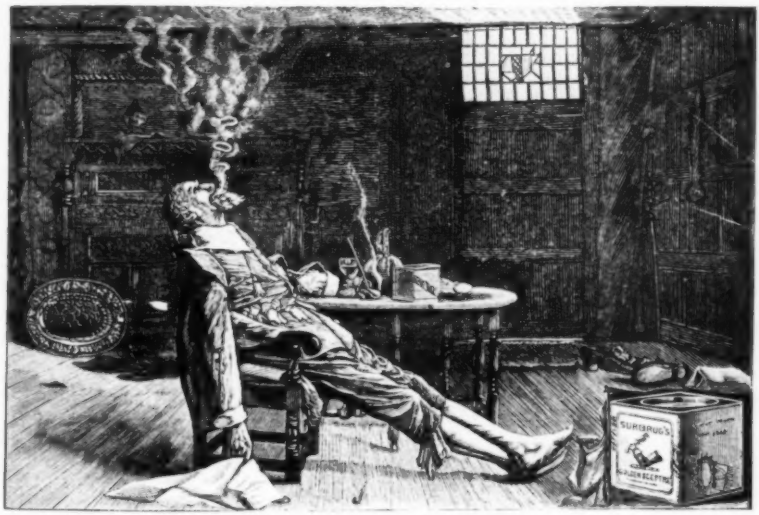

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